DOCUMENT RESUME

ED 128 276 SO 009 395

AUTHOR	Stehney, Virginia A.
TITLE	Environmental Curiosity Sampler 2: For Use with Environmental Study Areas in Illinois.
INSTITUTION	Illinois Inst. for Environmental Quality, Chicago.
REPORT NO	IIEQ-76-03
PUB DATE	Mar 76
NOTE	317p.; For a related document, see ED 103 339
EDRS PRICE	MF-$0.83 HC-$16.73 Plus Postage.
DESCRIPTORS	Adult Education; *Discovery Learning; *Ecology; Elementary Secondary Education; Environment; *Environmental Education; Field Trips; Human Geography; *Information Sources; Inquiry Training; Interdisciplinary Approach; Land Use; Learning Activities; *Natural Resources; Observational Learning; *Physical Environment; Pollution; Resource Units
IDENTIFIERS	Illinois

ABSTRACT

The Sampler provides ideas and lists resources for an interdisciplinary study of environment in terms of a person's immediate surroundings, distant sites, and facilities. Although it was developed for use by parents, teachers, youth group leaders, students, and interested individuals in the state of Illinois, many of the activities would be appropriate in any state. As a more inclusive second edition of the 1974 Sampler, this handbook encompasses all of Illinois and regards every place as a potential study area. Activities stimulate awareness of growing plants around the home, neighborhood garbage disposal and recycling processes, land use throughout the state, and problems of erosion and water purification. State and federal environmental areas in Illinois are listed and described, which include fish hatcheries, tree farms, hiking trails, and wildlife refuges. The Sampler identifies reading material, community resources, and special activities for each topic. Appendices contain a glossary, a list of organizations and courses concerned with ecological issues, a reader reaction sheet, publishers' directory, bibliographies, and an index. (AV)

Documents acquired by ERIC include many informal unpublished materials not available from other sources. ERIC makes every effort to obtain the best copy available. Nevertheless, items of marginal reproducibility are often encountered and this affects the quality of the microfiche and hardcopy reproductions ERIC makes available via the ERIC Document Reproduction Service (EDRS). EDRS is not responsible for the quality of the original document. Reproductions supplied by EDRS are the best that can be made from the original.

ENVIRONMENTAL CURIOSITY SAMPLER

2

U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

PERMISSION TO REPRODUCE THIS COPYRIGHTED MATERIAL HAS BEEN GRANTED BY

Eunice Choi

TO ERIC AND ORGANIZATIONS OPERATING UNDER AGREEMENTS WITH THE NATIONAL INSTITUTE OF EDUCATION. FURTHER REPRODUCTION OUTSIDE THE ERIC SYSTEM REQUIRES PERMISSION OF THE COPYRIGHT OWNER

SCOPE OF INTEREST NOTICE

The ERIC Facility has assigned this document for processing to SO

SE

In our judgement, this document is also of interest to the clearinghouses noted to the right. Indexing should reflect their special points of view.

ED128276

SO 009 395

IIEQ Doc. No. 76/03

for use with environmental study areas in illinois

100% recycled paper

FOREWORD

ILLINOIS
INSTITUTE FOR
ENVIRONMENTAL
QUALITY

The Illinois Institute for Environmental Quality, created by the Illinois Environmental Protection Act of 1970, has some responsibility for environmental education in Illinois. To aid in teacher instruction and curriculum development, the Institute supported the production of the second edition of this Environmental Curiosity Sampler, expanded to encompass all of Illinois. The Sampler should stimulate teachers, parents, students, and citizen groups to regard various types of sites and facilities as environmental study areas.

The Sampler supplements both edition one (limited to northeastern Illinois) and Environmental Education and Your School Site, published in 1974 and 1973. The Samplers take you out of the classroom and off the school site to observe and use your environment from a different point of view. These books are, we think, a significant addition to the environmental education literature.

The Open Lands Project is a non-profit citizens' association organized in 1963 to enhance the quality of the environment of the greater Chicago region in three ways:

OPEN
LANDS
PROJECT

1. By assisting in the permanent preservation of open space;
2. By assisting educational institutions in developing patterns for use of existing public open space as environmental study areas; and,
3. By serving as a resource center and referral agency for people seeking information about environmental problems and opportunities, open space preservation, and related matters.

©1976 Virginia A. Stehney

ENVIRONMENTAL CURIOSITY SAMPLER

2

Virginia A. Stehney

illustrated by Enid Warner Romanek

State of Illinois
Institute for
Environmental Quality
Samuel G. Booras, Director

for use with environmental study areas in illinois

Symbols Used in This Book

- ● indicates an item in a list
- ▶ indicates an activity

Note: Please fill out the Reader's Reaction Sheet in Appendix. If you wish, you may request a Directory of Illinois Environmental Information.

Additional copies of this handbook are available to Illinois residents (as long as the supply lasts) by writing "Environmental Curiosity Sampler 2", Illinois Institute for Environmental Quality, 309 West Washington Street, Chicago, Illinois 60606.

Printed by Authority of the State of Illinois
Date Printed: March, 1976
Quantity Printed: 5,000

This publication has been cataloged as follows:

Stehney, Virginia A.

Environmental Curiosity Sampler 2 - for use with environmental study areas in Illinois. Chicago, Illinois, Institute for Environmental Quality, 1976.

308 p.(IIEQ Doc. No. 76/03)

1. Education-Environmental. 2. Environmental study areas - Illinois. I. Illinois Institute for Environmental Quality. II. Title.

IIEQ Environmental Information Center.

Illinois Institute for Environmental Quality
309 West Washington Street
Chicago, Illinois 60606
312-793-3870

Printed on 100 percent recycled paper

About the author:

Virginia Stehney's 15 years' teaching experience has covered kindergarten through 6th grade and environmental courses for elementary teachers. Her most recent training has led to a Master's degree from Governors State University in 1974 with a major in environmental education (EE). Mrs. Stehney has served on the National Education Association's Task Force on Environmental Education (1970-71) and the Task Force on Environmental Education of the Illinois Office of the Superintendent of Public Instruction (1972).

She is currently the EE Coordinator for elementary District 58 (Downers Grove), member of the Environmental Quality Control Commission, Village of Downers Grove, and member of the Illinois Curriculum Council (Illinois Office of Education) as representative of the Environmental Association of Illinois.

In addition to the original Environmental Curiosity Sampler, Mrs. Stehney is the author of several articles published in professional magazines and a book for the primary grades on noise.

About the illustrator:

Enid Warner Romanek's drawings have been exhibited in galleries in and around Chicago. Her work is represented at the Sales and Rental Gallery of the Art Institute of Chicago. She studied both writing and illustration at Syracuse University, graduating with a BFA in illustration in 1959.

She is the author and illustrator of many published children's stories and books.

TABLE OF CONTENTS

Foreword --
  by Angela Trabert, Institute for Environmental Quality.. inside front cover
  by April Young, Open Lands Project.......................
Letter to Curious Individual 1
Reactions from Readers to first Environmental Curiosity Sampler.................. 3
Acknowledgments.. 4

At Home 5

  What Is Around You?................................. 6
  Are Green Growing Things Nearby?.................... 9
  Do You Take Water for Granted?...................... 12

In Your Neighborhood 22

  Getting More Acquainted with Your Neighborhood...... 23
  A Close Look at Buildings........................... 29
  Living Things Around You............................ 46
  All that Garbage and Trash.......................... 60
  What Do You Hear?................................... 68
  Beauty Around You................................... 73
  In a Vacant Lot..................................... 76
  Under the City...................................... 81
  Over the City (Air)................................. 83
  School Sites--Use and Development................... 90

Farther from Home 95

  Transportation...................................... 96
  Importance of Land Use.............................. 111
  More about Land Use................................. 127
  History of Illinois................................. 143
    A Partial List of Living History Sites............ 163
  That Valuable Asset, Lake Michigan.................. 165
  Open Spaces/Green Areas............................. 171
    Forest Preserve/Conservation Districts............ 176
      List of Forest Preserve/Conservation Districts.. 177
    Local Parks....................................... 183
    Land under Illinois Department of Conservation.... 183
      List of State Parks............................. 184
      List of Historical Memorials.................... 186
      List of Illinois Conservation Areas............. 187
      List of State Forests........................... 188
      List of State Fish Hatcheries................... 188
      List of State Tree Farms........................ 188
    Nature Preserves.................................. 189
      List of Nature Preserves........................ 191

Prairies.. 205
  List of Prairies................................ 210
Lands Administered by Federal Government............ 216
  Lands under U.S. Army Corps of Engineers.......... 216
  Indiana Dunes National Lakeshore................. 221
    List of Biking and Hiking Trails............... 225
  National Wildlife Refuges........................ 226
    List of National Wildlife Refuges.............. 230
  Shawnee National Forest.......................... 231
    List of Special Areas in Shawnee National Forest 233
Cemeteries... 234

Around the State 236

Energy... 237
  List of Environmental Study Areas for Energy...... 252
Wastes as Resources................................ 253
Weather.. 267
Who Makes Environmental Decisions?................. 274
  Organization Chart of American Government......... 286
  A Partial List of State Agencies with Environmental Concerns.................................. 288

Appendices 290

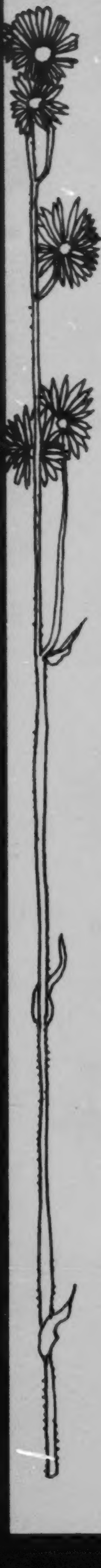
Glossary... 291
Resources--People, Agencies, Organizations; Workshops, Seminars, and Courses on Ecology; Activities to Watch for... 292
Reader Reaction Sheet.............................. 294
A Partial Directory of Publishers.................. 295
Bibliography....................................... 298
Annotated Bibliography............................. 300
Index.. 305

The Environmental Education Handbook (for Illinois)

is available from

Dr. Lance Bedwell
Environmental Education Specialist
Illinois Office of Education
Springfield, Illinois 62706
(217) 782-5235)

This Handbook has sections on the Law, the Plan, Sample Curriculum units, more resources (bibliography, directories, curriculum guidelines, etc.).



Dear Curious Individual

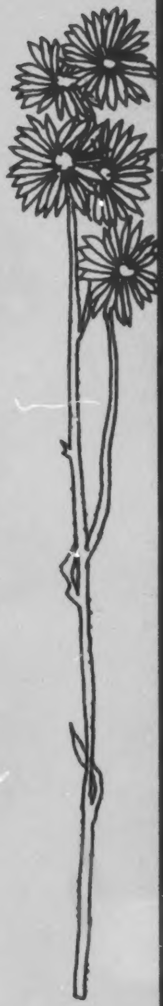
This handbook is the second publication of a two-part project. The original *Environmental Curiosity Sampler*, which appeared in early 1975, was written to use with environmental study areas in the six northeastern Illinois counties. The general information in the *Sampler* has been revised and expanded and chapters have been added to make this *Sampler* for use with environmental study areas in the rest of Illinois. Traditionally, such study areas have been ponds, prairies, forests, and other natural areas. The purpose of the project that resulted in the original *Sampler* was to collect and contain in one book, lists of many kinds of environmental study areas. However, as the project proceeded, we came to view *every place* as a potential study area, where one can see the impact, or lack of impact, of people on the environment. For this approach, it was realized that many people need help to learn how to observe. Thus, the original purpose of the handbook was broadened considerably.

Whether you are a parent, teacher, youth group leader, or simply an individual who welcomes new ideas, we hope there is something in this *Sampler* to interest you. Our beliefs that people are naturally curious about the world around them and want to make sense out of it and that people learn best when feelings are involved as well as intellect have strongly affected the contents of this book.

It was assumed that elementary teachers would be the main users of the original *Sampler*, but many activities were included that could be used by individuals or families and by people of all ages. It has been encouraging to have youth group leaders, camp counsellors, and parents let us know that they find it useful. (See comments following this letter.) High school teachers have written for copies; science teachers to use the lists of areas; art, history, and English teachers to find ideas for projects. College and university librarians have requested copies.

"Environment" as used here, is what is immediately around you as well as areas farther away. It begins where you are--which may be a different point for each individual--and expands to an ever larger area. So the *Sampler* starts with how to observe your immediate surroundings and then includes information on the wide variety of environments found all around Illinois.

Rather than being comprehensive, the Sampler is intended as a resource book from which the user can pick and choose. Background information is presented first, including questions to ask and occasional activities, then lists of specific activities, and finally a bibliography. The wide margins provide space for notes.



Background information and questions have generally been written in the simplest terms one would use with children so that the reader would not have to determine how to say something more simply. Anyone using the material with older children or those with more background, may want to change the wording.

As will be evident, learning about the environment is seen as interdisciplinary. There has been stress on trying to see the world whole rather than fragmented, to see interrelationships rather than isolated aspects, to be aware of feelings as well as "facts". Therefore, the information and activities have not been divided into grade levels or subjects such as science or social studies. As you think of your own activities, you realize that life is integrated, it is of a piece, rather than divided into subjects and levels.

We hope this Sampler will help you look, think and perhaps act and react in more depth to what is around you--alone, with a friend, with your family, with several others, with a class--you decide how. We further hope the Sampler helps improve the quality of your life by bringing you increased enjoyment and understanding as it helps you become more environmentally aware and informed.

Sincerely,

Virginia A. Stehney

* *

Here is what parents, educators, college students, and others have said about the original Environmental Curiosity Sampler:

It's readable--"simple and easy style", "well-designed and written", "...it invites the reader in"

It's informative--" a new look at something old","the basic concepts and approaches used in this book are easily transplanted to other parts of the country."

It involves the reader--"...in a great deal of thinking utilizing inductive processes; no one simple answer can be given in response to questions asked", "makes one want to readily participate in an environmental activity", "I especially like the idea of involving people's feelings throughout the book."

Other comments--"good aid to teachers...interesting and beneficial for students; also interesting to other adults I have shown it to", "college students or preschoolers could enjoy the wide range of activities", "very useful no matter what age" , "a marvelous idea book...hundreds of ideas that can be used in and out of the classroom...many of the ideas could be used in language arts, music, history, art, and science classes...based on the discovery method." (From a high school) "My first impression is that of gratitude. So many times teachers will complain about the lack of such information, lack of time to sort things out, to find resource materials. This Sampler will meet the needs of many such teachers."

"I got a copy at my library and was so enthused by it I would like one for my family and for teaching other children."

"...it does not matter whether you are a teacher, student, businessman, or whatever. Everyone, and the book points this out, can get into ecology and awareness."

ACKNOWLEDGMENTS

Thanks go to the many friendly people over the State who, in giving generously of their time, ideas, enthusiasm, and expertise, have contributed greatly to Environmental Curiosity Sampler 2.

Recognition to Gunnar A. Peterson, former executive director, and Wayne H. Schimpff, former director of environmental education, both of the Open Lands Project, who initiated and supported the project that led to both Samplers.

Special appreciation to: Angela Trabert, Environmental Scientist at the Illinois Institute for Environmental Quality, for her careful, creative editing of this manuscript and her encouragement and support, both financial and moral, for both Samplers; and to Dr. Gordon L. Goodman, environmental consultant, for a touch uniquely his in providing valuable background information and thoughtful suggestions.

Heartfelt thanks to Douglas E. Wade, Assistant Professor, Lorado Taft Field Campus, Northern Illinois University, and to Kenneth V. Fiske, executive director of the McHenry County Conservation District, members of the Steering Committee for the Samplers, who added ideas, information, inspiration, and humor to the project.

Thanks also to Doug Wade for his inspired suggestion of Environmental Curiosity Sampler as the titles of these two handbooks.

Particular appreciation to Elenore T. Pounds for her invaluable advice and encouragement and to that "Curious Individual", my friend Alaire B. Shields, for her environmental concern, her specific research and writing of the History chapter and her help in examining ideas as well as sites.

And last, gratitude to my husband, Andrew Stehney, for his understanding and moral support during the time of intensive work.

AT HOME

What Is Around You ?

If you are like most people, your senses have been under-used. Most people go through their days missing out on a great deal that is around them. However, since colors, sounds, smells, noises, and so on have a definite effect on the way we feel and behave, you may like to become more aware of them. (If you are one of the rather rare individuals who is already sensitive to his environment, you may want to go on to another chapter.)

The exploration of your environment can begin now, right where you are--at home, at school, or wherever else you are. (You will notice that this material is directed to an individual, but a parent or teacher can reword the information and questions for a family or for students.) You can use all your senses eventually, but let's proceed with one at a time, beginning with your eyes.

Seeing--What gets your attention as you look at your immediate surroundings? Write down things you see, such as a building, a tree, or an animal. Make a long list. Then note how some of these things may be alike, perhaps in color, or size, or texture. Note any similarities in their function. Try to determine other ways they resemble each other.

Now give some thought to ways these things are different. Use the categories you considered for similarities. Try to add other categories.

Next, choose one thing on your list. Think of the ways that thing is changing. Try to determine the cause(s) of the change. Consider what effect you may be having on that thing or it on you. Try to project what changes will occur to that thing in 10, 25, or 50 years. If that thing will no longer be around, what might have happened to it?

At this point think of some of the things you see that you do not like. Choose one thing. Could you do something to this part of your environment so that it would be improved? How could this be done? Would it help to work with other people on such a project? How would your proposed changes affect other aspects of the environment? What you have been considering here is a simple sort of "impact statement". For more on impact statements, see list of THINGS TO DO in chapter on "Land Use".

Look again at your list. Consider the color(s) of the things you do not like. Compare them to the colors of things you like. Do you notice any pattern to your reactions? Do your feelings about colors affect your feelings about things that have those colors?

You may be interested in noticing the various kinds of advertising around you, including stop signs and speed limit signs, signs for doctors' offices, churches, and so on. List them and indicate their colors. Notice the colors that attract your attention. Consider the effect of colors on your feelings. How would you feel with only green around you? Or only blue? Or only black? Think how color affects your choice of clothing.

Smelling--Now let's concentrate on smells. In people the sense of smell is perhaps the least developed sense. Breathe deeply. List the different smells you can detect. Most of the time smells are combined, but try to separate them and then determine where they come from.

Do you find some odors more pleasant than others? If so, why do you like them? Are some odors caused by air pollution? If so, can you tell the source? (car exhaust? factory smoke? something else?) Can you do anything about this pollution? (Look for more ideas in the chapter "Over the City.")

If you think your sense of smell helps you in your daily life, list ways it helps. Try to think of ways to make your sense of smell keener. Do you want it to be keener? Perhaps you would rather not smell some things in your environment.

Hearing--Sounds are very important to us, especially near a street or railroad so we are aware of danger. However, as noise in our environment has increased, we may have unconsciously used this sense less. Because this topic is dealt with in the chapter "What Do You Hear?", it is not developed here.

Tasting--While we may taste things unwillingly, such as pollutants in the air, tasting is difficult to do in the way we have been approaching this topic. Perhaps you can think of reasonable, helpful activities for this sense.

Touching--Many things in our surroundings might tempt us to use our sense of touch--for example, the velvety or smooth surface of some plants, a rough stone or brick wall or bark of a tree, a furry live or toy animal. Shut your eyes and see what you can learn about an object by feeling rather than looking at it. Do you use your sense of touch often? If not, you may want to further develop this sense. Look around you and try to think of two or three activities to do this.

THINGS TO DO:

- ▶ Think about smells outside when the first rain begins to fall after a dry spell, in the woods or meadow on a hot day, when a road or roof is being tarred, and so on.
- ▶ Think how your area may have smelled 50 or 100 years ago, how it may have looked, what sounds might have been there.

- ▶Think about, and perhaps write about, how you would have used your senses if you lived in a forest about 300 years ago and depended on hunting for your food.
- ▶Take the list of things around you; consider items one at a time, listing words that describe the colors, the smells, the sounds, the textures; see what a variety of words you can get.

BOOKS TO ENJOY:

Aliki; My Five Senses. Crowell, 1962. Primary. $4.
Freestrom; Five Senses. Benefic Press, 1970. Primary $4.
Vasilu, M. The World Is Many Things. Day, 1967. Primary. $4.

Rachel Carson in her beautiful book The Sense of Wonder, Harper & Row, 1956, urges us to open ourselves up to our feelings about what is around us.

"One way to open your eyes to unnoticed beauty is to ask yourself, "What if I had never seen this before? What if I know I would never see it again?..."

"Some of nature's most exquisite handiwork is on a miniature scale, as anyone knows who has applied a magnifying glass to a snowflake...An investment of a few dollars in a good hand lens or magnifying glass will bring a new wonder into being..."

"For the sense of smell, almost more than any other, has the power to recall memories, and it is a pity we use it so little..."

"Hearing can be a source of even more exquisite pleasure but it requires conscious cultivation..."

"...for the child, and for the parent (adult) seeking to guide him, it is not half so important to know as to feel..."

Are Green Growing Things Nearby ?

Many people who live in rural areas and small towns are in closer touch with the natural world than most people in larger towns and cities. They are much more aware of people's dependence on the soil, water, sun, and weather. However, not everyone in rural areas is attuned to the natural world. Many individuals do not know, for example, the negative effects of the use of chemical pesticides, herbicides, and fertilizers on the soil, air, and water. Perhaps information, ideas, and suggestions in this Sampler will pique their interest or concern and motivate them to learn more about various subjects included in this book.

There are many large areas in Illinois where plants of various kinds are raised. These areas vary from fields of agricultural crops like corn and soy beans to fields of tomatoes and other vegetables that are produced for canneries to mushroom farms and fields of produce often marketed in roadside stands. What plants do you see grown on a large scale in your area? Look also for orchards. You may notice that some of them are "pick-your-own" places.

You may see grass, trees, or flowers from where you live, perhaps in a yard or park. If so, how do nature's colors and shapes make you feel? Are you aware that seeing growing things has any effect on you? Some individuals realize they need to see green, growing plants often for peace of mind or renewal of spirit. They may also enjoy the beauty of bare branches because of the shapes themselves and also because of the promise of spring they know is hidden in those seemingly dead branches.

tomato plant

If you have a yard, notice what is growing there. Are there trees, bushes, and flowers? If not, why not plant some? Many growing things require little care, and even a mini-yard or a few potted plants add beauty to your world--as well as moisture and oxygen. Learn other ways plants help our environment.

Look closely at what is growing. Watch changes at different times of the year. Notice how the buds on the trees and shrubs are formed in the fall. Notice their waxy or other covering to protect them from the rain and snow. Enjoy the variety in size and shape.

Think how we depend on soil for these beautiful growing things as well as for our food. Besides soil, what do plants need to grow? For more on plants, look at "Living Things Around You".

Perhaps you have a vegetable garden or know someone who has. You may have a patio or balcony tomato plant. Such "container gardening" is becoming popular. Or you may have tucked a few tomato plants in a flower bed or put lettuce or radishes in a border. If you have no room for a garden, contact your local park district. Look under (your town) Park District in the telephone book or phone your town hall for information. Some park districts are making land available for gardens. Apartment complexes and companies have set aside garden plots.

Even if your home does not have a yard or is far from a park, you can have the joy of watching green things grow. The simplest hardy potted plant or window box may brighten your spirits and surroundings. Plants are almost like pets and are wholly dependent upon you for their care. Learn how to care for the kind of plant you choose. Ask a florist, or look for a book or pamphlet at your library, bookstore, or other stores.

THINGS TO DO:

- Visit a demonstration garden of vegetables and flowers; watch newspaper for announcement of date of field days; check with garden clubs, colleges and universities, and University Extension Service.
- Students can grow plants from seeds, bulbs, and slips in the classroom or in a school garden. Check with your waste water treatment plant to find out if sludge is availabe to use as fertilizer.

A word of caution about sludge--

You may want to limit use of sludge to shrubs, lawns, trees, and non-root vegetable crops. There is some controversy (and a lot of research currently) about the uptake of

What green growing things can you see at county and state fairs?

trace metals and heavy metals by root crops (potatoes, beets, onions, etc.). Some of these metals tend to concentrate in certain plant material. There may be adverse health effects from regular ingestion of these metals.

- Contact your town government or park district to see if they have a mulch pile with material available to the public.
- Learn about a compost pile and perhaps start one.
- Browse in your bookstore, supermarket, hardware or garden supply store to see their books on house and garden plants.
- Have children make posters using theme "Have you Thanked a Green Plant Today?"

BOOKS TO ENJOY:

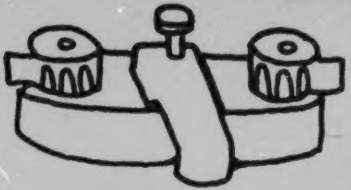
Dubkin, Leonard; The Natural History of a Back Yard. Henry Regnery Co., 1955. Adult.
Polgreen, John and Cathleen; Backyard Safari. Doubleday, 1971. 6th grade level. $4-5.
Stone, A. Harris and Irving Leskowitz; Plants Are Like That. Prentice-Hall, 1968, 6th grade level. $3-4.
Sullivan, George; Plants to Grow Indoors. Follett, 1969. Upper primary grades. $2.

Books Especially Recommended by Virginia Beatty, Consultant in Environmental Education and Urban Horticulture, Chicago Horticulture Society

National Audubon Society; A Place to Live. Urban ecology unit for 4th-5th grades. Student manual 75¢, teacher's manual $1.50. Write Educational Services, National Audubon Society, 1130 Fifth Ave., New York, N.Y. 10028.
Russell, Helen Ross; Ten Minute Field Trips. J.G. Ferguson Pub. Co., 6 N. Michigan Ave., Chicago, 1973. For teachers - paperback $7.
Skelsey, Alice and Gloria Huckaby; Growing Up Green: Children and Parents Growing Together. Also useful for teachers, grandparents, and individuals. Workman Pub. Co., 231 E. 51st St., New York, N.Y. 10022. $4.95.

Write Windrift Prairie Shop and Nursery for free list of gardening books, including those on growing plants under lights. R.D. 2, Oregon, Il. 61061.

Do You Take Water for Granted ?



Have you ever really considered water and its importance in your environment? Did you think about any of the following uses?

- People must have water for body processes.
- People use water in many ways--for cooking, washing, growing crops, manufacturing, transportation and recreation.
- Plant and animal life need water to grow and to provide food, clothing, and shelter for people.
- Some species of animals need water for breeding places and/or homes.

Once you begin to get involved, you notice water is all around--in faucets; running through pipes; in your refrigerator in the form of ice and frost; in fountains; in creeks, marshes, ponds and lakes; in puddles and gutters; as rain, hail, sleet and snow; as dew, mist, and fog; in retention ponds and flooded areas.

There are various kinds of water problems around the state, for example:

- in some counties there is insufficient water, especially during July and August
- in many areas occasional flooding is troublesome and damaging
- flooding and runoff water result in excessive erosion, with loss of topsoil and siltation (filling with silt) affecting water quality
- drinking water is not adequate in some sections of the state: quality is variable, quantity may be insufficient; in some parts of the state poor water quality is caused by acid drainage from land which has been strip-mined
- there is contamination of many surface wells, which may be caused by effluent from waste treatment plants, by high nitrate levels due to excessive application of fertilizer to fields, by phosphates from over-fertilizing and from animal wastes.

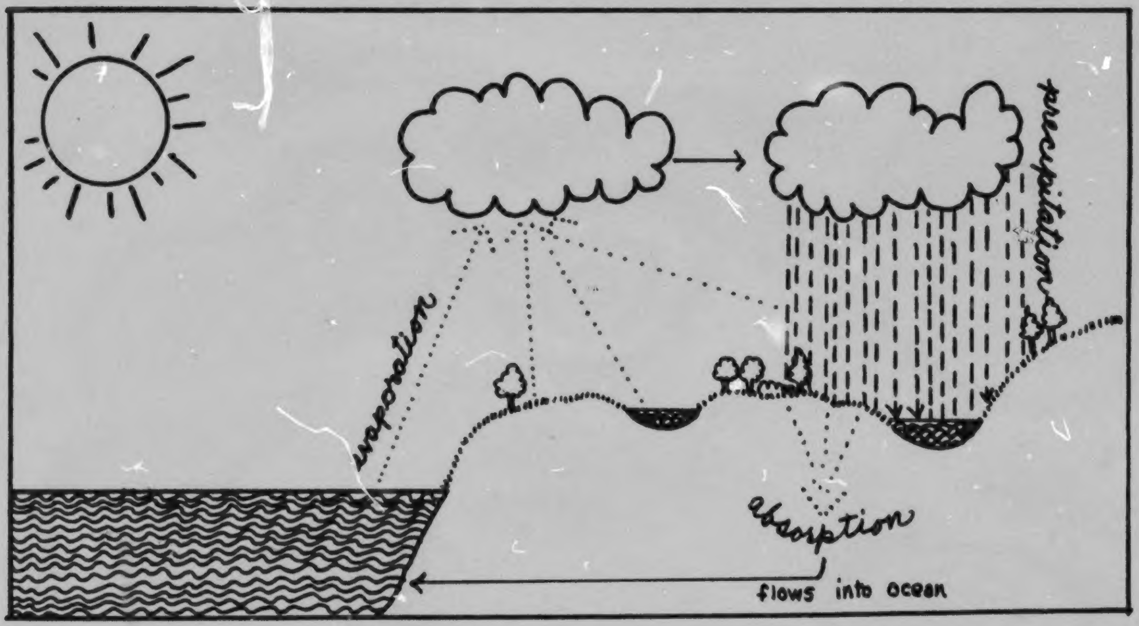
Periodic flooding is a sometimes irksome, often destructive problem in many parts of Illinois. It takes different forms: over-bank (from a swollen stream) or that caused for a short time by heavy rainfall, inundating basements and low natural and man-made areas such as ponds and railroad underpasses. There is the paradoxical situation that

Do You Know:

The making of steel requires as many as 65,000 gallons of water; almost 1 ton of water is used to make 1 ton of paper; 6 gallons of water are used in oil refineries for every gallon of gasoline produced. (from educational reprint "Water--What Would We Do Without It?" from Ranger Rick's Nature Magazine, October, 1970, published by National Wildlife Federation, 1412 - 16th St., N.W. Washington, D.C. 20036.)

while flooding is a concern at times in many places in the state, having water of sufficient quality at the right place at the right time is hard to manage in some of these same areas.

The Water Cycle



Do you know that the water cycle is one of the most massive physical events that takes place on earth? The heat from the sun changes the tiny water particles on the surface of the ocean, lakes, or land into invisible water vapor, which rises into the air. When this warm, moist air comes into contact with cool air, it is cooled and unable to hold its moisture. The moisture then falls as rain or snow.

Rain may fall directly into a lake or river, or it may drain into ponds and marshes from which it gradually sinks into the ground, replenishing the underground water supply. Water that soaks into the ground goes down until it reaches hard layers of rock it cannot easily penetrate. Then it fills up the spaces of the earth above the rock. This water is called ground water, and the top of the ground water level is the water table. When the ground is saturated with water up to the surface, there is a marsh, pond, or lake, and the water table is at the surface.

When rain falls on a forest, the drops go from the tall trees to the shrubs or young trees to shorter plants. Finally, the water drips onto the decaying plant material on the ground and easily soaks into soil openings.

Where water runs over bare soil, little water filters into the earth. The rain splashes up as it hits the soil, taking a bit of the soil with it. The muddy splashes close the surface openings of the soil. The harder it rains, the faster the openings are sealed. On bare slopes, the water rushes downhill, carrying away the soil and becoming muddier. Streams become higher and filled with silt, and whatever is nearby--fields, homes, highways, factories--may be flooded.

Can you trace various paths the rain may take when it falls on your yard or on a driveway or street? When it falls on other places in a town or on your farm? When it falls in the center of a large city?

Drinking Water

Do you know where your drinking water comes from? If your community or area has a problem with water, you may be aware of the situation. Moreover, you may know that Chicago and numerous communities in Cook and Lake counties obtain their water from Lake Michigan. Other towns and cities around the state rely on other lake or river water for their municipal needs.

However, many property owners and communities rely on wells for their water supply. Deep underground there are porous rocks that hold water. Municipal wells may be drilled into these rocks. In much of the southern two-thirds of the state the deeper water is quite salty, however. Therefore, only the upper few hundred feet of rocks yield potable (drinkable) water. In the northern third of Illinois, where the deepest water wells are located, fresh water is found more then 2,000 feet deep in some places. Faulty placement of private wells in relation to septic systems or feed pens and lots can result in contamination of the water. To be sure of pure water, samples can be sent or taken to an Illinois Department of Health laboratory in your part of the state for a free analysis.

If you have a private well, do you have the water analyzed at least annually?

The laboratories are located at:

2121 W. Taylor, Chicago, Il., 60612
134 N. 9th Street, Springfield, Il., 62701
P.O. Box 2467, Carbondale, Il., 62901

It is recommended that routine analysis be done once a year. If you have any doubts about the water or the well has been repaired, the water should be checked.

What may be the reasons why recently-dug wells have had to be dug deeper than older wells? Might it be partly because of increased covering of the land surface with blacktop, concrete, and buildings, causing rain and melted snow to run off rather than soak in or drain into a pond or marsh and gradually soak into the ground? And also due to increased use of washing machines, dishwashers, and other machines by an increasing population, as well as rising industrial water use? All of these influences lower the water table.

Industries use either public water, private wells or surface streams. The greatest industrial withdrawal of water is for air conditioning, supplying boilers, washing, cooling, condensing, conveyance, and sanitary services. Most all industrial processes consume only a small part of the water they use, with the rest available for reuse after processing if it can be properly treated. Industrial use from surface streams may not conflict with domestic water use. However, the streams' usability for recreation or irrigation may be affected.

In areas where the water supply is still adequate, will it always be so easy to turn a faucet and get a generous supply of water? During the last few years newspaper articles have quoted hydrologists (water scientists) who urge municipal and regional planning for water resources. With reserves of water being used faster than nature can replenish them, the hydrologists say the time will come in parts of Illinois when the water supply will be limited to that produced by rainfall and snow, or for communities in northern Illinois perhaps even piped all the way from Lake Superior. If planning is not done and development not limited, some of these experts say, our lives could be drastically affected by a reduced water supply. At present, where the water is insufficient in amount or poor in quality, people have learned to use this precious resource carefully.

Special Research

Find out if water can be treated so that it can be reused industrially or so that it is potable (fit to drink). If so, how costly or difficult is the process?

THINGS TO DO:

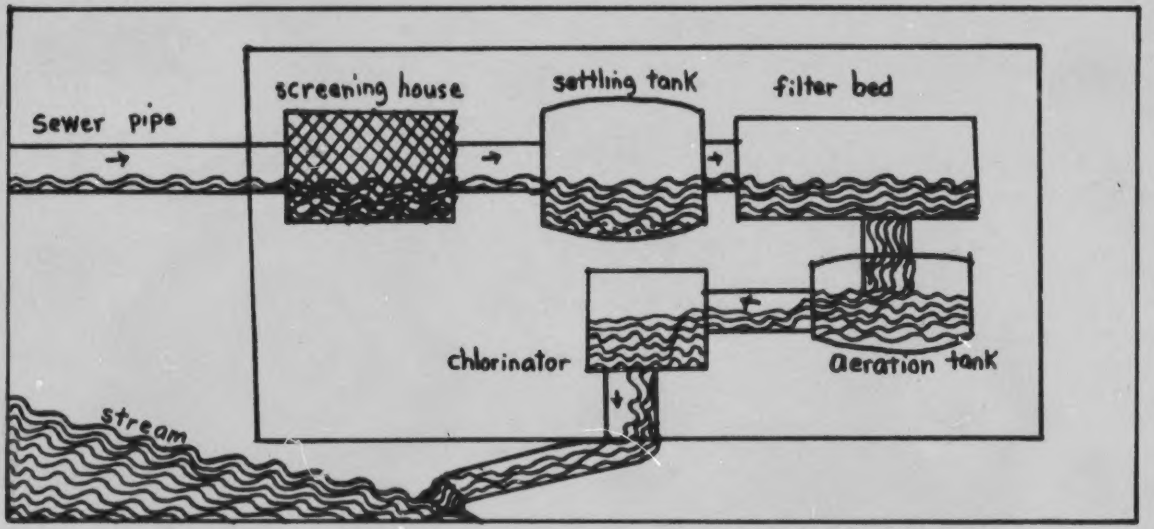
- Visit your town's water purification plant or inquire about its wells. Find out what is done to the water.
- Locate the floodplains of nearby streams.
- Learn what steps are being taken to minimize flood damage.

Waste Water

Where does waste water--from washing your hands or the dishes, from bathtubs and toilets--go after it drains from your home? In many areas--in town and country--homes have septic systems in which a continuous flow of waste material is decomposed by bacteria.

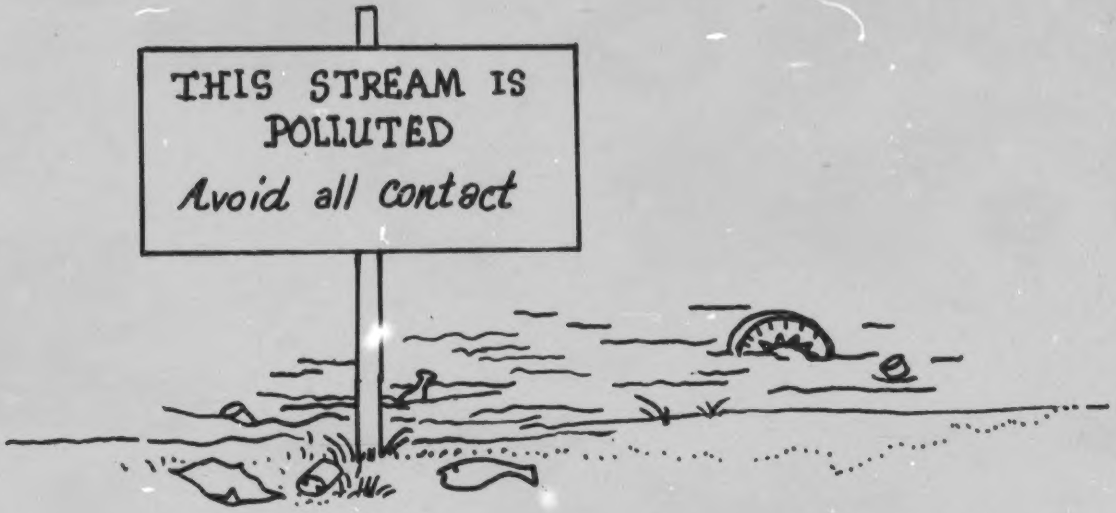
In communities with sewers, the waste water enters the sewer pipes. Then it goes to a waste water treatment plant. In the plant, the waste water is screened, solids and liquids separated by settling in sedimentation tanks. The water is filtered, chlorinated to kill certain germs, and released to a stream. Or there may be secondary treatment, during which bacteria act on the organic solid parts of the waste. A few treatment plants have tertiary (three-stage) treatment, which filters out extremely tiny particles, perhaps new forms of pollutants, including radioactive wastes.

What happens after water is pumped from a well? It may be treated with chlorine to kill germs and perhaps with other chemicals such as fluoride. Water from a lake or river goes to a water purification plant. After it is purified, it is pumped to homes, stores, businesses, and factories, perhaps through miles of pipes under the streets.



Waste Water Treatment

In the past, small amounts of wastes could be dumped directly into a stream without danger to health because streams were able to purify themselves. The natural action of the oxygen in the water plus the action of bacteria and other microscopic plants and animals broke down organic impurities into harmless substances. But today, most streams, if not all, have more organic material, along with industrial wastes, than they can process naturally and have become polluted. Pollution, of course, endangers health and interferes with the stream as a source of water, as well as causes death to fish, wildlife and plants and makes a stream unusable for recreation. Have you seen a sign like this, perhaps in a forest preserve?



THINGS TO DO:

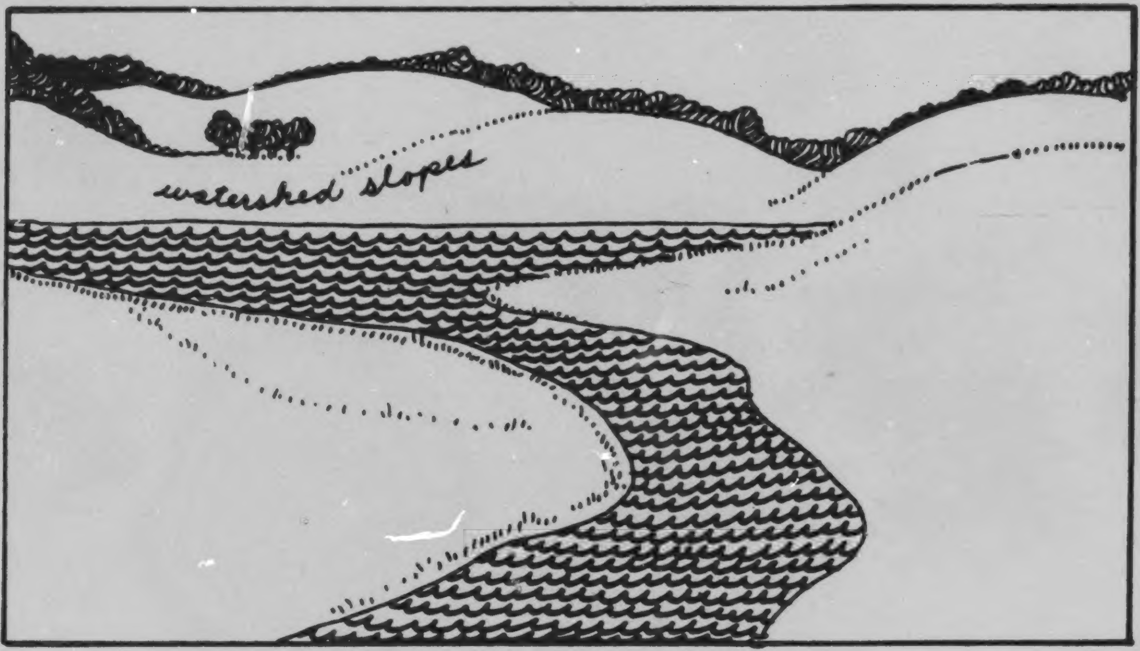
Have you thought of the reasons for catching water in the "old rain barrel"? Many a head was washed and garden patch or flower bed watered this way. Is it feasible to do this again?

- Visit your local waste treatment plant. Does it have 1st, 2nd, or 3rd stage treatment?
- Learn about the Fulton County project of the Metropolitan Sanitary District of Greater Chicago, where digested sludge is transported to a rural area and sprayed or disced into strip-mined land or other land with poor soil. (Also see section on Wastes from Water Treatment Plants in "Wastes as Resources" chapter of this Sampler.) For a booklet, write to the Sanitary District, 100 East Erie Street, Chicago, Il., 60611.
- Learn how kitchen and yard pumps worked in the "old days".

Watersheds

Do you know that you live in a watershed? Everyone does. Perhaps you have heard the word but are not certain of its meaning. Graham and Van Dersal in their book Water for America define watershed as an "area of land from which all runoff water flows into the same stream". When rain and melted snow are not absorbed by soil, they may run off the land into creeks that flow into larger streams. A watershed may be as small as the land which drains into a small creek, or it may be several miles long, including the land draining into several streams that all drain into one river. All areas then, whether urban, suburban, or rural, are in watersheds.

The speed of runoff water may vary considerably depending on the amount of rainfall, degree of saturation of the ground, the slope of the land, and the condition of the surface of the land (whether the latter is vegetation which may soak up moisture, or little vegetation, concrete, black topped areas, or roofs which cause fast runoff).



Flooding is a serious problem in some areas. (See also Flooding section of "More about Land Use" chapter.) What causes it? What can be done to alleviate or prevent it? Flooding occurs, of course, during or after heavy rainstorms or when considerable snow suddenly melts. If the streams cannot carry away the load quickly enough, the water floods nearby low-lying areas. About 10 percent of a watershed is considered floodplain, an area that will flood at some time. As distressed and angry homeowners in flooded areas have asked for help, village or county officials have realized the consequences of building on floodplains. It has been said that the floodplain belongs to the river, a truism some officials and homeowners have learned too late to avoid problems.

In some areas watershed associations have been formed to deal with water problems of flooding, pollution, and water supply. In the past a problem might be "solved" in one area, only to arise somewhere else. Flooding problems can be solved, but it is rarely easy. Recent state laws set standards for building in a flood plain. Water detention areas of various kinds--artificial lakes, reservoirs, and forest preserve floodplains, for example--are being used for flood control. As the value of swamps and marshes in flood control and renewal of ground water supplies are being increasingly understood, efforts are being made to retain such areas. Can you think of more solutions?

The Soil Conservation Service (SCS) of the U.S. Department of Agriculture gives both financial and technical help to local groups in planning and carrying out watershed projects. The projects may be for one or more purposes--flood prevention, municipal and industrial water supply, agricultural water management, recreation, or fish and wildlife development. Any organization interested in learning about such help may contact their local SCS office (check phone book or ask Information of your telephone company).

Regional, watershed-wide planning is a necessity if future water problems are to be avoided. Watershed management includes the consideration of a number of complex interrelated factors. To adequately project effects of land use changes, soil and vegetative cover conditions, channel capacities, and economic pressures must be taken into account. Preservation of vegetation cover, for example, will maintain a watershed's ability to function naturally. Planners must also consider off-site (downstream) effects as well as on-site effects to minimize future flood problems.

R. D. Murphy
Soil Conservationist, River
Basin Planning Staff
U.S. Department of Agriculture

THINGS TO DO:

- When it rains, study a given area to see what happens to the rain water:
    - a heavily-wooded park or preserve which has thick leaf litter; watch the rain falling and notice the size of drops that fall from the larger trees; compare them with those that fall directly from the sky;
    - a heavily grazed woods or pasture; notice how the ground feels to your feet, how the water moves over the surface;
    - an area of bare ground;
    - a grassy yard;
    - streets and concrete or black-topped driveways.
- In which areas does the rain soak in? Where does it run off? If there is runoff, where does it go? Might it go to the Gulf of Mexico without having a chance to soak into the ground? Look for a "model" of a small watershed in a vacant lot or on a schoolground.
- Arrange with park personnel to work on conservation projects, such as planting trees or grass on a gullied slope or planting ground cover or shrubs on the banks of a small creek which may be eroding its banks.
- Make a diagram of the water cycle--as complex as possible.

BOOKS TO ENJOY:

Bloome, Enid; Water We Drink. Doubleday, 1971. Primary. $3.50.

Laycock, George; Water Pollution. Grosset and Dunlap, 1972. Intermediate - adult. $5.

Lefkowitz, R.J.; Water for Today and Tomorrow. Parents Magazine Press, 1973.

Radlauer, Edward and Ruth; Water for Your Community. Elk Grove Press, 1968.

U.S. Environmental Protection Agency: A Primer on Waste Water Treatment. Available from U.S. Environmental Protection Agency, Midwest Environmental Information Center, 230 S. Dearborn, Chicago 60604.

U.S. Geological Survey; the following primers are available from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402.

Primer on Ground Water by Helene L. Baldwin and C.L. McGuinness. 1963. High intermediate - up. $1.50.

Primer on Water by Luna B. Leopold and

Walter B. Langbein. 1966. High intermediate - up. $1.50.

Primer on Water Qualtiy by H.A. Swenson and H. L. Baldwin. 1965. High intermediate - up. $1.55.

Van Dersal, William R.; *The Land Renewed: The Story of Soil Conservation* (includes water). H.Z. Walck, 1968. Intermediate - up. $5.

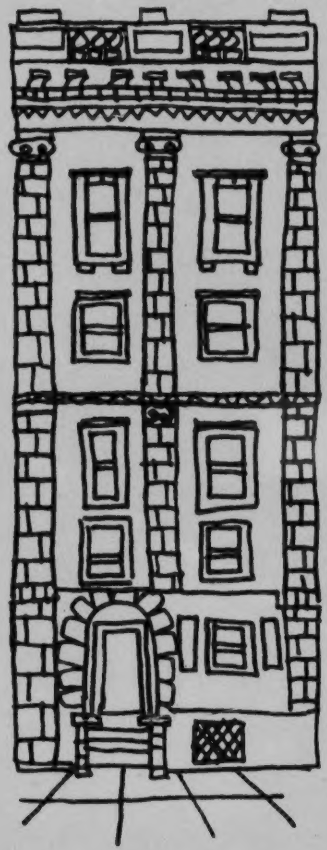
Van Dersal, William R. and Edward H. Graham. *Water for America*. Walck, 1956. Grade 7-up.

IN YOUR NEIGHBORHOOD

Getting More Acquainted with Your Neighborhood

How well do you know your neighborhood? You may live in a small town, a rural area covering many miles, a suburb, a section of a medium-size city, or a neighborhood of one of our largest cities. Many neighborhoods have personalities of their own. Within these areas many people tend to know one another. They may know storekeepers by name or, more than that, as friends, as well as knowing all the social and recreational activities that can be enjoyed. They may see each other over the back fence, at church and other social groups, at sports events as well as on Main, Division, or Elm Street, in and out of the local newspaper office, and in local stores and other businesses.

If you live in a rural area or in a small town, you may already know a great deal about what is around you. People in such areas, for example, are often more attuned to nature, being closer to it, and to the other people who live there because there are many opportunities to know them well. But even you may have given little thought to some of the questions presented here. Some questions may be more pertinent to urban areas. In that case choose those which suit you.



Wherever you live, why not take a more careful look at your neighborhood...

As you walk around your neighborhood, look closely at what is there. Work to increase your awareness. Remember to look overhead, too. First, concentrate on the housing. Is there a mixture of housing types that provide people with a choice as to space, cost, and style? Is the housing generally pleasing to look at? Is it located near parks, schools, stores and transportation? Is it reasonably free of traffic, noise, and other nuisances?

GROCERY
BUS STOP

What about stores? Do you find that they are within easy reach of residential areas? Are the stores convenient to public transportation, or do you have a rely on a car to reach them? Do they fill basic shopping needs, or are there some things you have to go a long way to obtain?

Are jobs available near workers' homes? Are there factories which create traffic, noise or odor problems for residential areas? Are there sources of pollution in the neighborhood?

Do residents of the neighborhood have quick and easy access to necessary services of all kinds? Especially medical, fire, and police?

Are there enough parks, playgrounds, or other open space for the people in the community? Are the areas easy to reach? Does your neighborhood have trees, shrubs, and flowers around the buildings?

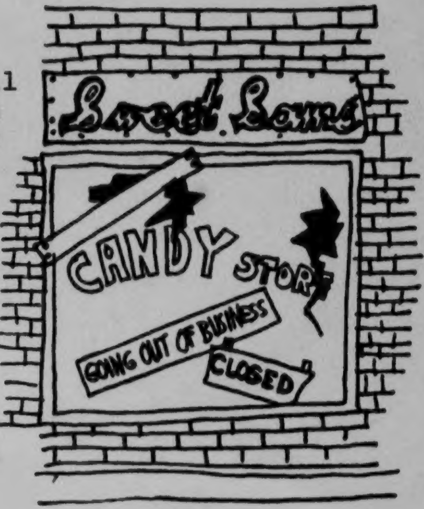
Have you considered the effect of such aspects of your environment as noise, trees, highrise buildings, air pollution--or the absence of any of these things--on the quality of your life?

Have you thought seriously about what you value in life, and how much of what you value you have in your life? Such thinking may lead you to decide to do one of more of the following:

- learn more about various aspects of the environment--perhaps with the help of this Sampler
- try to improve the quality of some of the aspects, perhaps by joining with others who have the same interest or are working toward similar environmental goals
- change some of the things you do or the way you do them
- learn more about "values clarification".

Activities to increase your awareness of what is around you, to develop the use of all your senses, can be as simple as taking a listening walk or looking for tiny or rough objects in a natural or manmade environment. Such activities can be brief, used in a yard or on a school ground--as the Ten Minute Field Trips in Helen Ross Russell's book (see "Books to Enjoy" at end of chapter).

Some communities are dying. Stores and homes may be vacant. As young people leave, older people die or move away, more appealing services and shopping areas become available elsewhere, and/or public transportation dwindles and disappears, communities suffer. In rural areas, ever-increasing large-scale farming continues to result in a decline of farm population. Even the pattern of farmers' retirement may change from the former practice of moving to a nearby small town to that of migrating to a distant, usually warm place.



(Since the early 1970's a significant reversal has been noted. The population shift first to the cities and more recently from cities to suburbs is now going to rural areas.)

What can be done to counteract deterioration of communities? Renovation of rundown buildings, making parking available, adding plants and trees will help some areas. Rural communities may try to interest industry in their area and to attract people as residents using such selling points as lower crime rate, big yards, uncrowded schools, more relaxed recreation, space, and a slower pace of life. Small communities may decide they need professional advice to get help of various kinds, including financial boosts. A creative idea is that of having a "circuit (city) manager" who would serve several communities. If your area is deteriorating, consider what you can do. Talk to others. Make plans. Take your questions to the Illinois Department of Local Government Affairs, 303 E. Monroe Street, Springfield 62706, (217) 782-6436 or Chicago, 160 N. LaSalle, (312)793-3113.

As you gather information about your neighborhood, you may wonder how to organize your material. Maps may be an excellent way:

- map a room, your home or your schoolroom or place of work (perhaps using scale); indicate activities in the various areas
- do the same for a yard or a schoolground
- then do the same for your neighborhood
- map the route you take to school or to a store --perhaps beginning with pictures drawn for houses, trees, churches, etc. on to more complex maps with a small scale and many symbols
- make a land use map for your neighborhood or your town, using different colors for different uses: residential, public, commercial or business, industrial, open space (differentiate for parks, schoolgrounds, farms...)

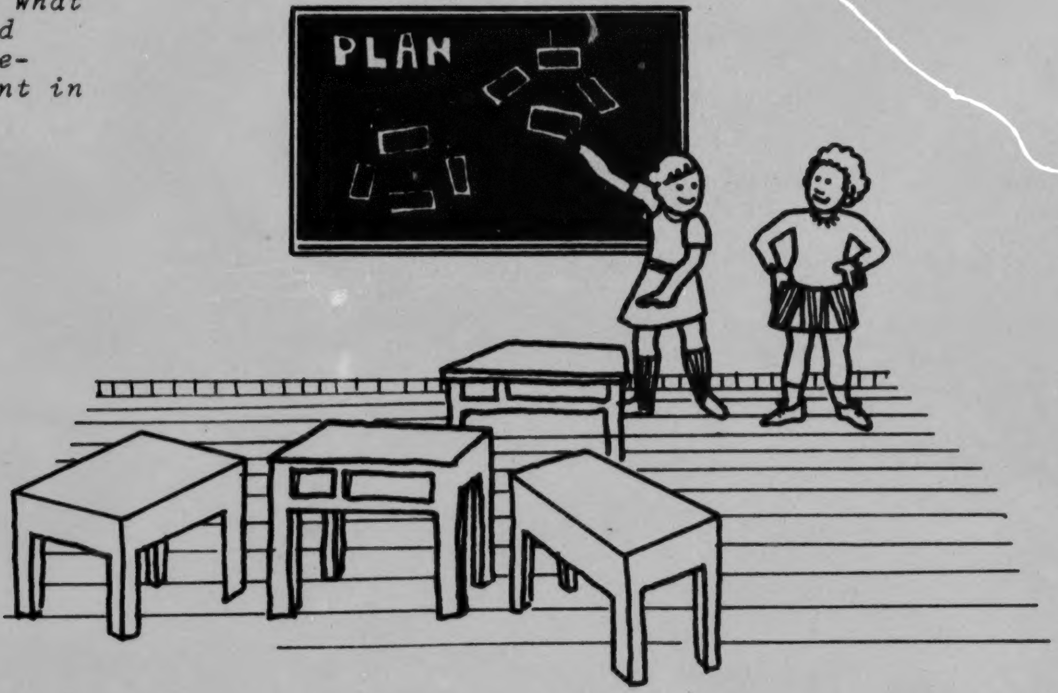
During the exploration of your neighborhood, you could discuss what a neighborhood (or city)

Special project:

In a class, one or several small groups might like to plan their own neighborhood or town--perhaps first with no restrictions; then a second time *being more realistic about what might be possible. Include considerable discussion about what they value and about the quality of life they would like. Have you included people of different ages in your neighborhood? Do you want to? What might retired people or preschoolers want in a community?*

needs; what you like about yours; what you would change. Occasionally there are groups working on problems in a neighborhood. Sometimes these groups are composed of neighbors; sometimes their members are from the entire town or city. You could contact a member of such a group and learn about what they are doing. Perhaps they would talk to a class or other group about their activities.

A classroom is an important environment where students and teachers spend a great deal of time, so, if you are a teacher, you may be willing to have the students try to plan a better way to arrange the classroom and then try out their plan.



- Would a different physical set-up of the room be better?
- Are books, materials, science equipment, and supplies easily accessible?
- Could the room be better arranged for small group work?
- Are some of the values that are important in the classroom the same as those people may have for their lives outside the classroom?

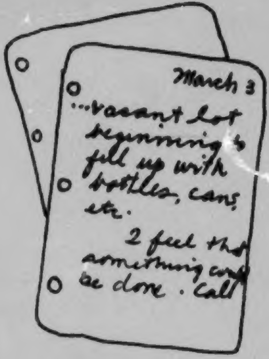
You will find that in order to get one thing the group wants, another might have to be given up. The plans should reflect values and priorities and allow for change if something does not work as expected.

Parents may be willing to try the foregoing planning with certain space in their homes or yards, planning it with their children and trying out the plans together.

You may want to look at your neighborhood from the point of view of what is changing; how you feel about it; what might you do about it.

THINGS TO DO:

- Keep a sketch book record of your neighborhood.
- Keep a log or diary of your exploration; see how clearly you can describe what you see and how you feel about it.
- Remember that photography can be a great tool and hobby. Plan a photo exhibit of what you like in your neighborhood; what you consider problems; or simply record "Our Neighborhood".



Many environments contribute to the make-up of a community. Every individual has a responsibility to know his community through observation of the needs of the individuals who live there and understanding that cultural background and life styles influence the community, adding or detracting in different ways from the total community. After identifying community services, e.g., schools, medical care, police and fire protection, safe drinking water, sanitary sewage disposal, and so on, the individual can understand better the changes that occur. He can take a more informed, active part in community affairs in order to try to effect change, recognizing, however, that changes should be made carefully with awareness of the consequences of environmental changes on people and the rest of the physical environment.

Nick G. Rodes
Math-Science-Environmental
Education Consultant
River Trails Public Schools
Mount Prospect, Il. 60056

BOOKS TO ENJOY:

Bendick, Jeanne. A Place to Live. Parents Magazine Press, 1970. Primary. $4.

Brennan, Matthew J. (ed.), People and Their Environment: Teacher's Curriculum Guide to Conservation Education. J.G. Ferguson Pub. Co., 6 N. Michigan Ave., Chicago. (312) 782-8284. Phone or write for information on guides for different grade levels.

National Audubon Society. A Place to Live. Urban ecology unit for 4th - 5th grades. Student manual - 75¢, teacher's manual - $1.50. Write; Educational Services, National Audubon Society, 1130 Fifth Ave., New York, N.Y. 10028.

Radlauer, Edward and Ruth Shaw Radlauer; What Is a Community? Elk Grove Press, 1967.

Russell, Helen Ross; Ten-Minute Field Trips. J.G. Ferguson Pub. Co., Chicago, 1973.

Scholastic's Earth Corps study units on Ecology/Conservation and Environmental Awareness. Scholastic Book Services, Inc. 904 Sylvan Ave., Englewood Cliffs, N.J. 07632.

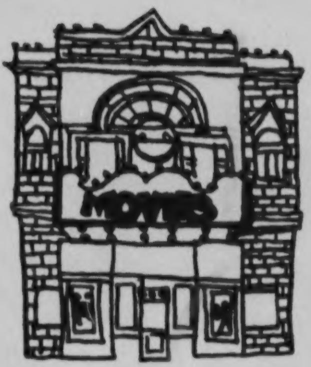
Simon, Sidney et al. Values Clarification. A Handbook of Practical Suggestions for Teachers and Students. Hart. 1972. $7.50 and $3.95.

U.S. Dept. of the Interior, Bureau of Land Management, All Around You: An Environmental Study Guide. For late elementary and junior high but adaptable to other grade levels. Available from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. Stock No. 2411-0035. $1.50.

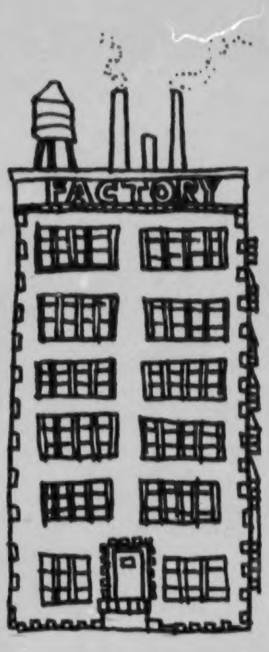
Wurman, Richard Saul (ed.), Yellow Pages of Learning Resources. MIT Press, 1972. $1.95.

A Close Look at Buildings

Individual Buildings



Take a close look at the buildings around you. Notice the materials used. Brick, wood, glass, stone, marble, concrete, aluminum or steel or several of these materials may have been used. You may see bricks held together by mortar. Perhaps you see concrete buildings erected by the use of molds, called forms, into which the concrete is poured. Then when the concrete hardens, the forms are removed. Because of the molds, concrete can be formed into a curved wall more easily than some of the other materials. Steel, a very strong material which does not take up much space, makes it possible to build tall structures. With the rather recent production of large sheets of glass at reasonable cost, many buildings have "picture windows", floor to ceiling glass doors, and window walls. This gives a light and airy feeling to the rooms, but it also presents problems of glare, heat loss in winter, and heat absorption in summer. How do these large window areas, then, affect the heating and cooling of the buildings and the consumption of electricity?



Choose a building. Think about whether you find it pleasing. If you do, can you tell why? Is it because of its variety? Notice its form, color, and the patterns in its design. Now look at patterns made by the windows and doors and other parts, such as balconies, of other buildings--houses, apartments, stores, commercial structures and factories. Do you find the regularity of spacing of windows pleasing or monotonous, or are you indifferent? Notice how the shape and form (the design) of an individual building indicate its use. You would probably not confuse a factory, for example, with a movie theater, even without their signs. Think about whether the building is comfortable and functional inside.

Perhaps you can watch a building near you as it is built. You might check, perhaps every week, to see what changes occur. Learn about the complicated operations involved. Consider taking pictures of the progress of the building. Learn what was on the site before. Find out if another building was torn down. See if you can learn what has been on the site over the years since the land was covered with forest or prairie.

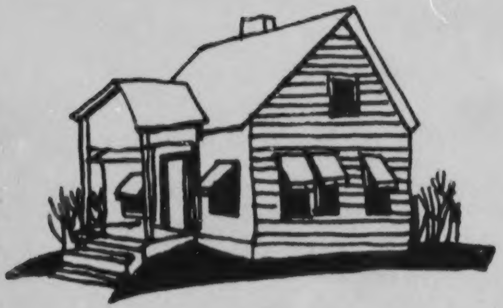
THINGS TO DO:

- If people were comfortable at 20 degrees F. below zero, how might their homes be different?

- What kind of "home" might you need on the moon?
- Design a home you would like--floor plan, outside design; include the space around your home.

In looking at the materials used in your building, you may find the following check list helpful:

Check all materials in list #1 that you see around the building.
Draw a line from the materials checked in list #1 to the places they appear in list #2.



#1

__ wood
__ brick
__ glass
__ granite
__ marble
__ slate
__ tile
__ concrete
__ limestone
__ iron
__ steel
__ aluminum
__ plastic
__ ________
__ ________

#2

window
window sill
door
floor
wall
ceiling
roof
stairs
sink
chalk Board
____
____

Buildings in the Center of Town

If you have never given it much thought, you may be intrigued by the suggestion to look closely at the buildings in the center of your town or your city neighborhood. This area may vary considerably from community to community: it may be around a town square, along a wide main street, on streets bordering railroad tracks, or in some other pattern.

Walk around. Look closely. What do you see? Is there a relaxed atmosphere? Are retired citizens and others able to pause for a while on benches? Is it a place you like to be? Do you feel that the people who live near here have pride in the area? Consider the reasons for your answer to the previous question.

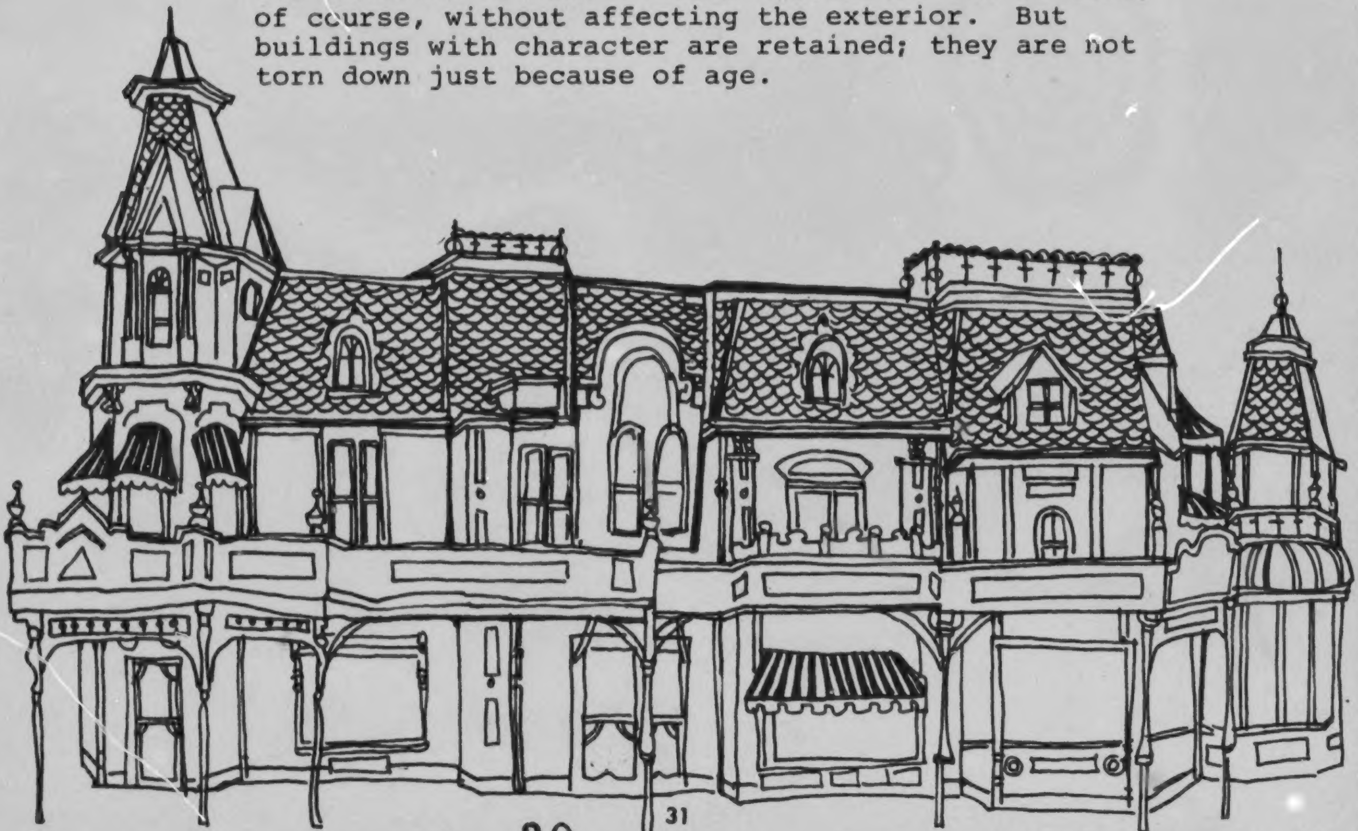
Some communities have preserved buildings for historic reasons or because the buildings are well-designed. Do you see such buildings? If older buildings have been preserved, you may notice that such buildings give identity to this area. You get a sense of place, a feeling that this area means something to you, that this is a special area because these particular buildings occur only here.

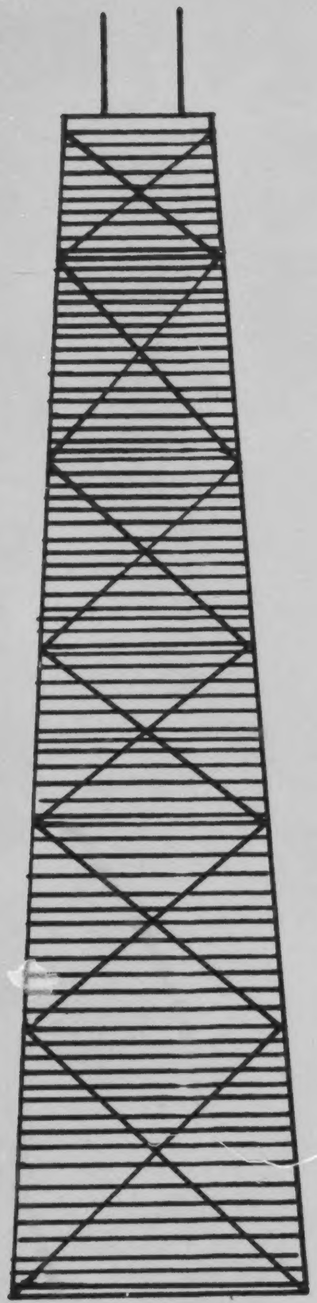
Perhaps older buildings have been kept and are in good repair, but no attempt has been made to keep continuity in design and building materials when newer buildings were added.

Perhaps the older buildings have been replaced completely by newer buildings. There may be chain stores, franchise businesses, and/or fast-food places with specific architecture which advertises the business. When there are many, or perhaps even only a few, such buildings, distinctive features which identify this particular area may be lost. It may become Anywhere, USA.

Perhaps you see buildings to which false fronts have been added to "modernize" them and perhaps make them easier to maintain. What is your reaction to these buildings? Do you see buildings that a few years ago had different fronts when other businesses were there?

Keeping older buildings in good repair does not mean that the inside is kept as it was. Remodeling the interior to make it more convenient can be done, of course, without affecting the exterior. But buildings with character are retained; they are not torn down just because of age.





JOHN HANCOCK CENTER

Highrise Buildings

Most living things need a special kind of environment to survive: a tuna needs a salt water environment; a coho salmon needs a fresh water river or a lake; woodland plants need a moist environment with certain sun and soil conditions; but people can live in just about any environment. How can this happen? What do people do if:

● it is too hot?	They may use air conditioning.
● there is too much water?	They may drain the area.
● there is too little water?	They may pipe in water.
● the area is too wooded?	They cut down trees.

In other words, people control their environment; they control the buildings in which they live and work.

It would seem to be obvious that buildings are for people. Would you say that most buildings are designed with people in mind? How do you determine the "success" of a building, for example, a highrise? By the awards it has won for its design? By its massive size? By the income it produces for its owners? For its use of new materials? Perhaps you agree with people who say a building's success should be judged by whether the people who live or work in that building are pleased with it. Others feel that a formal post-construction evaluation by the architects is necessary.

Let's picture (or go to look at) some of the new highrise buildings in Chicago. Let's do some wondering:

In some of our structures have we cut ourselves off too much from the natural environment? (Psychologists and behavioral scientists remind us that contact with nature is good for people's mental health.) When windows are sealed shut, we are cut off from the outside air. When artificial light is used continuously, we see little sunlight.

In many buildings it is possible to use more natural light and thus less electricity. However, when large window areas extending to the floor are used, people may be uncomfortable and keep themselves and their furniture back from the window walls. Also large window areas affect heating and cooling requirements.

What about the size of some of our tallest buildings? How do the buildings fit into their surroundings--both nearby and over a larger area? They may appeal to you because of their size. Some people, however, consider them out of human scale and feel that they affront human dignity. These people ask if these buildings are ignoring people. Some architects say that the massive highrise is under increasing attack. Even knowing that we can build tall buildings, the question is: SHOULD WE?

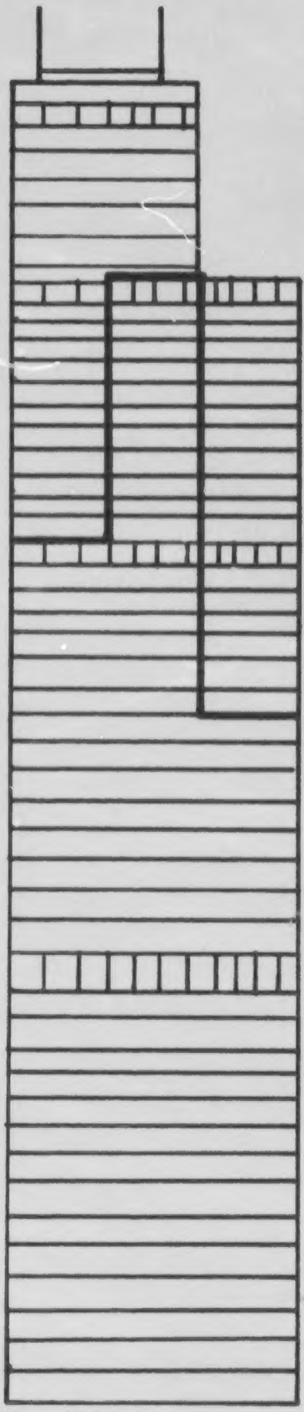
What happens in these "skyscrapers" when some of the mechanical equipment, including elevators, breaks down? Perhaps it does not happen often, but when it does, how do people react? Or what if there should be an electric power brownout or blackout?

Statements have been made that the John Hancock Center in Chicago contributes to urban life with its multi-use design: a combination of condominiums, offices, shops, banking facilities, recreation and more. Other people believe it is so out-of-scale, so overpowering on its site, its effect on traffic in the area so great, that its overall impact is negative. What do you think about it?

Chicago's Sears Tower (all 110 stories; 1,450 feet, and 9 towers of it) has had both praise and criticism. You may want to go to see it and look at it from various vantage points outside. Think about the impact on the surrounding area of its more than 16,000 workers, plus others who come to the building for various purposes. Sears Tower is a commercial building, not multi-use. Perhaps you want to be outside the Sears Tower from about 4:00 to 6:00 p.m. some working day to see what happens. How different might it have been if the Tower had been smaller and had been a multi-use building? Much is said and written these days about bringing more life 24 hours of each day to the downtown area of cities. Could this building have helped do this?

Creativity and imagination have led to multi-level shopping arcades, streets closed off for malls, promenades, shopping connectors on several levels in some stores--all of which have made the city centers livelier and more attractive to people as well as improved business.

(See section below on Energy Conservation for Buildings.)



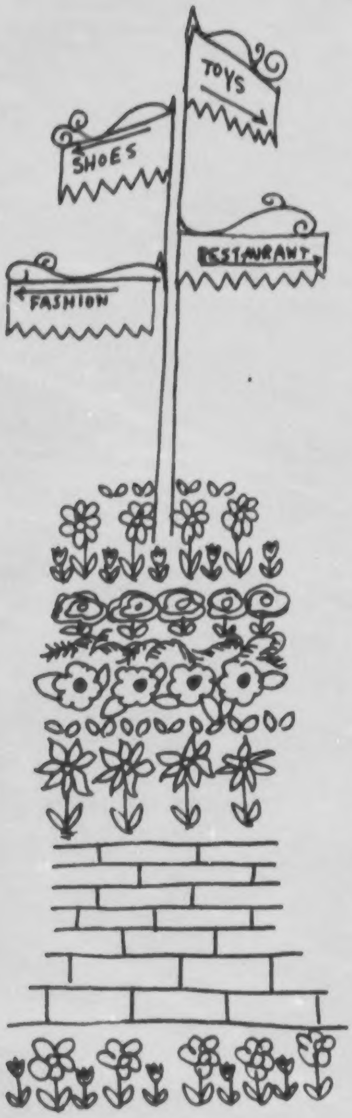
SEARS TOWER

(The foregoing material adapted from articles in the January-February, 1974, issue of *Architectural Forum* magazine and articles by architects in the *Christian Science Monitor* in February, 1974.)

Restorations

Restorations of areas are taking place in various places in the state. One fine example is the area around the Old State Capitol in Springfield. Many individuals, groups, and communities are becoming more interested in restoring old areas that have special significance to the local area.

Space around Buildings



Outdoor space is part of the environment and should be considered in relation to the surrounding buildings. People live in outdoor space and use it. Think of such spaces as yards, schoolgrounds, parks, plazas, and malls and how they are used.

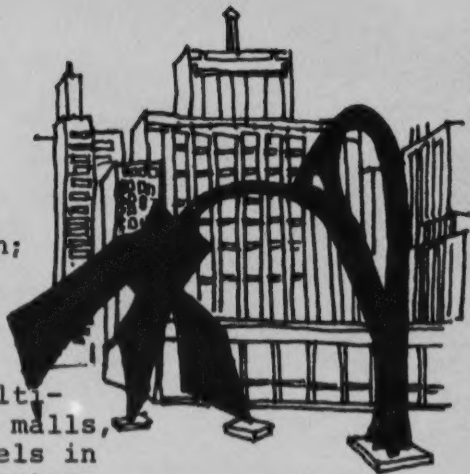
Look at the shopping centers or plazas built away from centers of town. Consider their architecture. Do you find the areas attractive and well-planned? Are there plantings of flowers and trees in the parking lots and around the buildings? Do they blend in with the surrounding areas? Are the parking areas designed to accommodate and speed traffic flow?

If you want to see the importance of open space to people in the center of a city, visit, for example, the "corridor" (the block between Dearborn and Clark from Randolph Street to Jackson Boulevard). The plaza space in this area has been said to be "one of the most important progressions of plaza space in America". When you see the people who use these areas, especially the plaza of the First National Bank, you may well agree with this statement. The reactions of people to these plazas ought to be a strong message to architects and engineers and their clients about how to help cities be people-oriented. The three major plazas in the Chicago corridor are:

- The Civic Center plaza--between Randolph and Washington; dignified, designed for ceremonial functions; with fountain, trees, and the Picasso statue.
- The First National Bank plaza--between Madison and Monroe; brings life to the area with its restaurants, bars, shops; has benches, foun-

tain, trees, shrubbery, and flowers; has a mosaic wall by Chagall.

- Federal Center plaza--between Adams and Jackson; with trees, flowers, and benches; has a Calder stabile.



Federal Center Plaza

Creativity and imagination have led to multi-level shopping arcades, streets closed off for malls, promenades, shopping connectors on several levels in some cities--all of which have made the city centers livelier and more attractive to people.

BOOKS:

Fein, Albert. Frederick Law Olmsted and the American Environmental Tradition. George Braziller, 1972. Adult. $10. Paperback $3.95.

Hitchcock, Henry-Russell, et al. The Rise of an American Architecture. Praeger. 1970. Adult. $10.

Holland, Laurence B. (ed.) Who Designs America? Doubleday, 1966. Adult. $1.95.

Rudofsky, Bernard. Streets for People: A Primer for Americans. Doubleday, 1969. Adult. $14.95. Paperback $5.95.

Scully, Vincent, Jr. Masters of World Architecture. Frank Lloyd Wright. George Braziller, 1960. Adult. $5.95.

Siegel, Arthur (ed.) Chicago's Famous Buildings. University of Chicago Press, 1970. Adult. $2.45.

Steadman, Philip. Energy, Environment, and Building. Cambridge University Press, 1975. Adult. $5.95.

The Chicago Tribune of Sunday, October 26, 1975, carried an article by Paul Gapp entitled "Design students poll the (First National Bank) plaza traffic for flaws and fine points". Excerpts from the article follow:

> "Architects rarely try to find out how well their buildings and other structures serve people.
>
> They make postconstruction evaluations to determine whether the client is happy and to make sure their creations are generally functioning according to plan.
>
> But that's not the same thing as talking to apartment dwellers, office workers, school pupils, hospital patients, and the dozens of other kinds of people who actually use buildings, as opposed to owning or managing them.
>
> Designers and behavioral scientists have begun awakening to the fact that the rarity of such inputs is an impediment to a more humane architecture.
>
> All of this puts a sharp edge of importance on an analysis of the First National Bank of Chicago plaza by landscape architecture graduate students from the University of Illinois at Urbana.
>
> Practically everybody agrees that the bank plaza--despite its flaws--is the liveliest, most handsome thing of its kind in Chicago. It has been praised by scores of professional and amateur critics. ...And so, last spring and this summer, (the students) stood in the plaza, took notes and photographs, followed and observed people, mapped their movements, and asked them questions.
>
> ...(The students point out that) 'the postconstruction evaluation process can...be looked upon as never-ending, as lessons learned from the past leading to new assumptions to be tested in the future.
>
> If architects would pay universal heed to this truth instead of endlessly repeating so many of their mistakes, the design absurdities with which all of us must cope would surely become far less ubiquitous."

THINGS TO DO:

- Visit the Old State Capitol in Springfield; note restorations in the surrounding area.
- Try to locate other buildings and areas that are being or have been restored.
- Go to see highrise buildings in a city. Ask people who live or work there how they feel about the building.
- Visit plazas in the center of Chicago or in other Illinois cities. Notice what kind of use people make of these areas.
- Visit the John Hancock Building and/or Sears Tower. Ask people who work or live at the Hancock how they feel about it. Ask people who work in Sears Tower what their reaction is to it.

Energy Conservation for Buildings?

Energy conservation is a subject that will be increasingly considered as the energy crisis continues and is better understood. Buildings are responsible for about one-third of all energy used in the U.S., a good part of which some experts say could be conserved. In a joint report by the National Bureau of Standards and the General Services Administration, it was agreed that energy used by heating, ventilating, and air conditioning systems in most buildings could be cut 30 percent.* Some mechanical engineers believe such reduction in energy consumption of U.S. buildings can be achieved at a sacrifice of NO essential services and few, if any, amenities. Unnecessarily high standards have been established in many buildings; for example, most office buildings are too well lit, producting eye strain and excessive heat which in turn requires more cooling.

The potential for energy savings in new buildings is even greater than in existing buildings if the natural outside is used to advantage in reducing dependence on artificially created indoor environments. Building design has a significant effect on energy conservation. However, energy use in buildings has not until recently been of great concern to architects, due partly to the past abundance of cheap energy. A small but growing number of architects is urging their profession to change their basic philosophy. They say there has been a tendency to produce buildings which fight the environment instead of working with it, that buildings have been over-engineered. Common-sense attention to site, orientation, sun-path, wind-path,

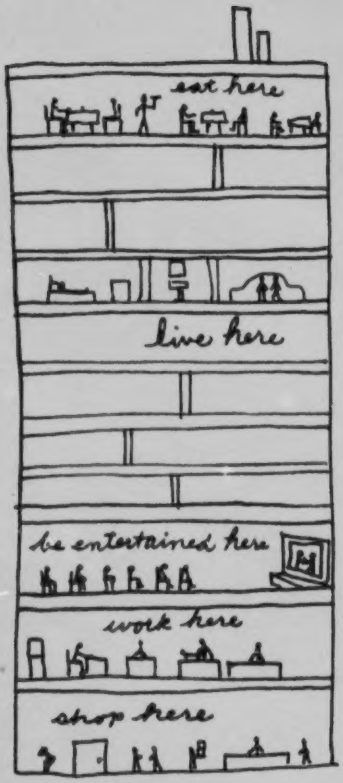
Because of the way some buildings have been designed and built, localized sun heating has caused heating and cooling systems in these buildings to run simultaneously. The systems attempt to maintain an indoor temperature which may differ by only a few degrees from that outdoors!

---

*Educational Facilities Laboratories (EFL), The Economy of Energy Conservation in Educational Facilities, New York (July, 1973), p. 7.

and even proper use of vegetation might well prevent situations which now require technical facilities requiring more energy to counteract.

Energy-conserving designs of buildings can cut energy use 35 percent or more. This is important because operating costs for energy over the life of a typical building may be as high as two times the initial cost of the building!



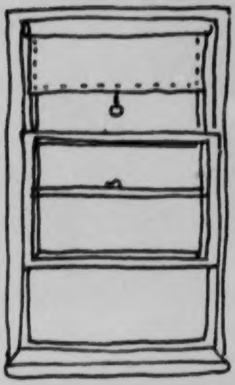
Consider these energy-conserving examples:

- the use of heavy, highly-insulative masonry rather than light construction materials, prefabricated walls, and modular units, most with non-insulative qualities
- extended use of the building--use only 8-12 hours a day wastes energy; a multi-use structure (with apartments, offices, theaters, and shops) makes efficient and consistent use of heating and cooling and also makes the surrounding area livelier and safer
- better siting of structures--a north-south exposure for the large walls is superior to an east-west exposure; the sun heats the east and west walls more than the south wall which can be shaded and which intercepts sun's rays at less direct angles
- planting trees along west walls of buildings whenever possible
- use of shaded glass which admits only one-fourth of the radiant heat admitted by unshaded glass exposed to sunlight.

Paying attention to a few natural phenomena, rather than ignoring them, can result in using the natural environment to help conserve energy:

- the sun rises in the east, swings south, sets in the west--keeping this in mind results in attention to site orientation, building shape, wall design, and window size. Frank Bridges, former president of the American Society of Heating, Refrigerating, and Air Conditioning Engineers, has calculated that if a rectangular building 2.5 times longer than its width is shifted so that the short axis faces north and south rather than east and west, the cooling load of the building will be reduced by 30 percent."*
- the sun is high in the sky in summer, low in

*Energy Conservation in Buildings: New Roles for Cities and Citizen Groups, National League of Cities, U.S. Conference of Mayors, and The Energy Policy Task Force of the Consumer Federation of America, January, 1975, p. 6.



winter--use of canopies, overhangs, horizontal louvers, shades, and/or fins can flexibly take advantage of this change.

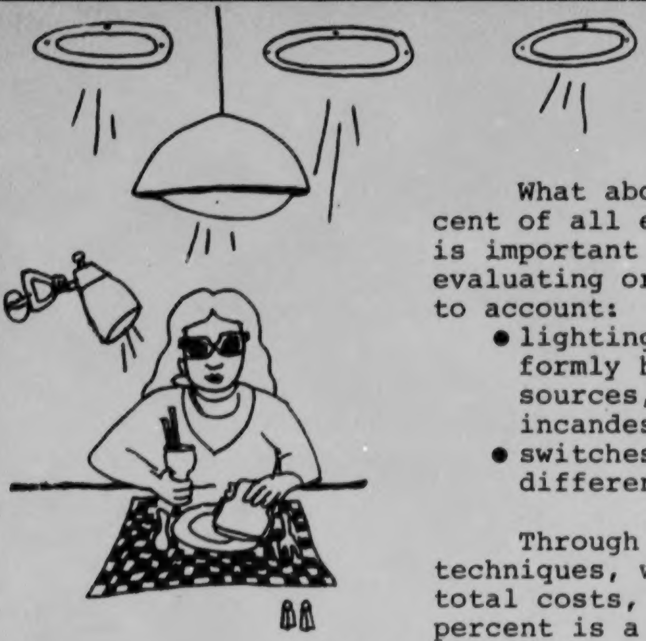
- breezes blow in most parts of the country much of the time--in the spring and fall and some days in summer and winter, windows could be opened; this reactionary design would require moving away from the present use of sealed buildings; it will also affect design (wide buildings are harder to ventilate naturally than narrow ones; orientation might be toward prevailing breezes)
- trees affect microclimate and energy conservation--deciduous trees offer shade in summer when shade is needed; they lose leaves in winter, allowing sun to come through and warm the indoors; (trees also act as windbreaks, filter out dust, prevent erosion, reduce noise, improve air quality, give off oxygen and use carbon dioxide , reduce air temperature through transpiration; trees properly placed can reduce the building cooling load up to 25 percent)
- the sun shines on buildings--it can be used for solar heating and cooling (see next section).

Experts urging more efficient energy use in buildings often stress a life-cycle approach to construction. Unfortunately, even though an energy-conserving design will result in reduced yearly cost, it requires a greater initial building cost:

- financing arrangements enable developers to make quick profits, encouraging them to build lower-cost buildings for a faster sale
- tax benefits encourage owners to sell buildings approximately every five years
- in municipal and governmental agencies, as well as private industry, capital budgets are usually separate from operating budgets; "regardless of the institution, when the link between initial capital costs and yearly operating costs gets lost in the budgetary paper shuffle, the basic justification of a life-cycle approach and the long-term energy costs associated with building design are overlooked."*

Besides design, improving building and maintenance equipment is energy-efficient. Studies show that there are large energy wastes caused by building operator ignorance and misuse of the basic mechanical system of the building. This error should not be time-consuming or difficult to correct or improve.

*Ibid, p. 13.



What about lighting in buildings? Since 24 percent of all electricity sold is used for lighting, it is important in an energy conservation program. In evaluating or designing a building's light, take into account:

- lighting for expected activity--instead of uniformly high levels, use the most efficient light sources, i.e., fluorescent bulbs instead of incandescent bulbs
- switches and dimming devices for areas with different uses.

Through the use of these and other conservation techniques, without altering behavior or increasing total costs, savings can be made. A reduction of 25 percent is a realistic objective for new buildings, and a 15 percent cut in light usage is possible in existing buildings.*

What about prefabricated systems? The use of such systems means that buildings are not designed to adapt to specific conditions and local climates of individual sites. An extreme example is represented by mobile homes, now accounting for more than a quarter of all new dwellings in the U.S. Lightly structured, identically designed mobile homes are sold from coast to coast. What do you think about this structural uniformity in relation to the great differences in climate in the various parts of our country?

Since homes use almost 20 percent of the total U.S. energy consumed, energy savings affected by homeowners can be significant. Many recommendations for conserving fuels (natural gas, fuel oil, and electricity) result in little loss of comfort, and often, in the long run, save the homeowner money. What conservation measures could you who are homeowners try immediately? If you have not already done so, and if it is winter, you can:

- turn down the thermostat 5 degrees or so at night (60 degrees is a good temperature) and more when you are away; this simple measure can have a surprising effect on the amount of energy used for heating
- keep the fireplace damper closed when not in use
- close doors and registers in unused rooms
- insulate your body by wearing a sweater
- lower the daytime setting of your thermostat; 1 degree less uses 3-4 percent less fuel; 5

---

*Ibid, p. 12.

degrees lower uses 15-20 percent less
- reduce hot water consumption, as in shorter showers
- turn off heating gas pilot light for the furnace during the summer months (if your heating system is in good condition and is well-maintained).

To avoid excessive heat loss in winter and heat gain in summer give thought to the following if your habitat does not already have these energy-conserving measures:

- weather-stripping and caulking of windows and doors--does any need replacing?
- storm windows--in moderate or cold climates the addition of storm windows can reduce energy loss by heating 25 percent or more; can be expected to pay for themselves in reduced heating and cooling costs within 10 years*
- other leakage, especially in the attic
- double panes or insulating glass where glass area is large
- furnace check once a year and frequent change of filters
- bulk insulation where winters are moderate; the Federal Housing Administration-Minimum Property Standards (FHA-MPS) (these are minimal and not universally accepted as adequate):
  3 1/2 inches in ceiling and 1 7/8 inches in walls.

Insulating a home that has electric heating and air conditioning beyond the FHA-MPS recommendations is often desirable, especially in hotter areas. Good insulation is as important in hot climates as in cold since it keeps heat out, thus making it pleasanter and reducing the required capacity of air conditioning systems. The National Bureau of Standards says:

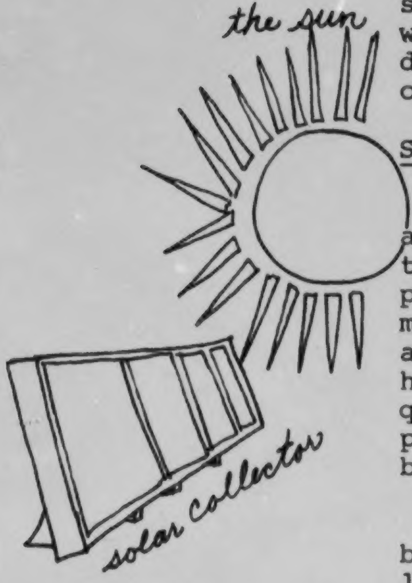
> "It is possible to reduce the heat loss or gain in residences by 50 percent through the use of thermal insulation in ceiling (6"), walls (3"), and floors (3"). In addition to conserving energy, increased insulation can save on heating furnaces (about 20 percent smaller), cooling machinery (about 10-15 percent smaller), and also smaller flues, smaller electrical wire sizes to equipment and also smaller duct sizes."**

To conserve energy in cooling, good architec-

---

*Readings on Energy Conservation, p. 56.
**Energy Conservation in Buildings, p. 9.

tural design will include buildings with windows that open and smaller glass areas. What used to be necessities in homes in past years--shade trees, porches, wide eaves, solid construction--seem to have almost disappeared. Are they valid considerations--worthy of being revived?



Solar Heating and Cooling for Buildings

Although solar space heating and cooling systems are currently available only on a custom-built basis, they are far from way-out schemes. The heating potential available from the sun, of course, is tremendous. The supply is available locally everywhere, and no distribution network is required. Solar heating is quite feasible technically. However, the question is still one of cost and of suitable approaches for different climates, sites, and sizes of buildings.

The use of solar energy for space heating in buildings has been the subject of research since the 1920's. In the U.S. at least 20 experimental houses have been built which use solar space heaters, and in some cases coolers. In most cases, these houses have supplemental power units from conventional electrical or petroleum sources, but the solar units have successfully handled most of the heating.

At the University of Pennsylvania, experimental work is being done to develop plans for modular mass-produced houses with high-quality insulation (to prevent heating-cooling losses) which have solar heating units. The goal of this work is to develop houses that can be located anywhere in the southern two-thirds of the U.S. and will use solar energy for at least 90 percent of the residential heating needs.

Solar Energy used to heat and cool buildings could greatly reduce peak demands for electricity--especially for summer air conditioning--with the result that fossil fuels could be used for petrochemical products for which there are no ready substitutes.

For solar heating, some form of collector is necessary. Since the sun may shine only at intervals during the day and not with great strength in the winter, it is also necessary to have some form of reservoir in which to store the collected heat and from which it can be released slowly as needed. The solar collector is generally made up of flat plates, set up facing south (in the northern hemisphere) and at an angle which might vary anywhere from the vertical to the horizontal. Heat can be stored in large tanks of water or gravel. It is transferred through the home just like heat from fuel-powered furnaces--through water pipes or hot air. Direct use of solar radiation for space heating may have a higher cost than conventional heating in initial investment in capital equipment; the fuel "cost" thereafter, however, in both the economic and environmental sense, is very small.

The more severe the heating requirements, the more economical the use of solar energy in heating and cooling buildings.

Few buildings with solar cooling equipment have been built until recently, with 4-5 constructed during 1974. Solar cooling is an especially attractive idea since the times of maximum demand are the same as the periods of maximum energy supply.

Although it may be many years before scientists and engineers are able to develop inexpensive ways of using sun power on a wide scale, interest and research in the field of solar heating and cooling for buildings are growing rapidly. You may be interested in watching for information on such developments.

THINGS TO DO:

- ▸ If you are a homeowner who has recently tried some of the energy-conserving suggestions in this chapter, compare former heating bills to your latest bill. Be sure to notice the number of units used rather than the amount charged, since the rate may have been increased.
- ▸ Look at buildings around your community; evaluate them for energy use. Can you suggest any measures they might use to increase energy conservation?
- ▸ A junior high or high school student might interview an architect, carefully planning questions in advance, and reporting back to the class. Ask questions about planning a building: design, lighting, materials used, heating and cooling, and landscaping. (Shade trees properly placed can be important.)
- ▸ Discourage overheating, overcooling, and overlighting of public buildings. When you see evidences of any of these, you may want to speak to someone in authority or write a letter to them explaining your reasons.
- ▸ Learn (more) about the advantages and disadvantages of lighting used as part of the heating system.
- ▸ Consider what experts you would include on your team if you were using a life-cycle approach to plan and construct a building.
- ▸ Go to look at a highrise or skyscraper; ask some people who live or work there how they feel about the building. Notice the building's impact on the surrounding area.

- Read a short history of the skyscraper, perhaps in Jory Graham's Chicago.
- Look in the public library for books on the Chicago School of Architecture.
- Try to locate a building that uses solar energy. An increasing number of small solar energy devices are being built around Illinois but were not yet available to visitors when this book went to press.
- Visit a greenhouse, which is an energy-collecting source, in the wintertime. See how the house "works", with the sun's rays passing through the glass, being absorbed by plants and other materials in the glass house, changed into longer wave lengths, and then trapped inside the greenhouse, thus keeping it warm.
- For information on school building energy mini-audits, contact:

  Mr. Ernest Dunwoody, Manger, Energy Conservation and Alternative Energy Section
  Division of Energy
  Illinois Department of Business and Economic Development
  222 S. College Street
  Springfield, Il 62706   (217) 782-7500

- To participate in/find out about the Illinois Energy Conservation Youth Leadership Training Program (adults and grades 10-12), contact:

  Professor Troyt York, Coordinator
  Energy Conservation Youth Training Program
  c/o Energy Management Program
  Eastern Illinois University
  Charleston, Illinois 61920
  (217) 581-2527

BOOKS TO ENJOY:

Bach, Ira. Chicago on Foot. Follett, 1969. Adult. $8.95; paperback $6.95.

A Composite of Energy Curriculum Guides and Enrichment Materials. Prepared by Michael A. Magnoli and Jonathan M. Wert. 1975. Mobile County Public Schools, P.O. Box 1327, Mobile, Al 36601.

Energy Conservation in Buildings: New Roles for Cities and Citizen Groups. Published by the National League of Cities (NLC), U.S. Conference of Mayors (USCM) and The Energy Policy Task Force of the Consumer Federation of America. January, 1975. Available from NLC and USCM, 1620 Eye Street, N.W., Washington, D.C. 20006. $3.00.

Energy Conservation Policy Options for Illinois. Proceedings of the Second Annual Illinois Energy Conference. June 24-25, 1974. Sponsored by the Energy Resources Center of the University of Illinois at Chicago Circle in cooperation with the National Science Foundation and the UICC Office of Extension. Published by the Office of Publications Services, University of Illinois at Chicago Circle. Write to Energy Resources Center, UICC, Box 4348, Chicago, Ill., 60680. (312) 996-4490.

Graham, Jory. *Chicago: An Extraordinary Guide*. Rand, McNally, 1969. Adult. $8.95.

The Household Energy Game by Thomas W. Smith with John Jenkins. December, 1974. Advisory Report #409. Order from Sea Grant Program, University of Wisconsin, 1800 University Avenue, Madison, Wisconsin 53706.

Illinois Energy Newsletter. Monthly newsletter of energy events of state and university interest. Free. See *Energy* Conservation Policy Options for Illinois (above) for ordering address.

Large, David B. (ed.). *Potentials for Energy Conservation*. The Conservation Foundation, Washington, D.C., 1973. Out of print. (Borrow from your local library or regional interlibrary loan network.)

Readings on Energy Conservation. Selected Materials compiled by the Congressional Research Service at the request of Henry M. Jackson, Chairman. Committee on Interior and Insular Affairs, U.S. Senate, pursuant to S. Res. 45. The National Fuels and Energy Policy Study. 1975. Serial No. 94-1 (92-91). Order from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. $4.80.

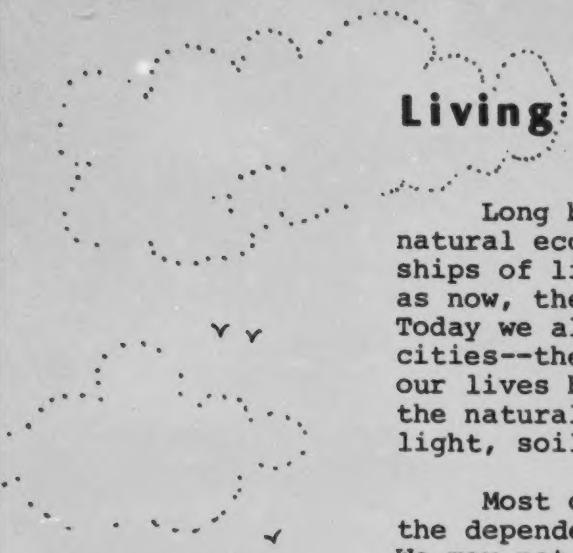
Rudofsky, Bernard. *Streets for People: A Primer for Americans*. Doubleday, 1969.

Siegel, Arthur (ed.). *Chicago's Famous Buildings*. University of Chicago Press, 1970. Adult. $2.45.

Steadman, Philip. *Energy, Environment and Building*. Cambridge University Press, 1975. $5.95.

!!!!!!An excellent source published in 1975!!!!!!

National Science Teachers Association. Energy-Environment Materials. *Source Book* (Order No. 471-14692; $4); *Mini-Unit Guide* (471-14696; $3); *Materials Guide* (471-14694; $2). Complete set-$9. 50¢ P&H Complete, 25¢/single vol. NSTA, 1742 Conn. Ave.,N.W., Washington, D.C. 20009.



Living Things around You

Long before people were on this earth, there were natural ecosystems, a term used to describe relationships of living things and their surroundings; and then, as now, the interconnections of organisms were complex. Today we also talk about the interrelationships in cities--the urban ecosystems. No matter how urbanized our lives become, however, we are still dependent on the natural ecosystems for life and health--upon sunlight, soil, air, water, plants and animals.

Most of us do not understand thoroughly enough the dependence of all people on natural ecosystems. We may not realize the importance of clean air, unpolluted water, or fertile soil for our survival, as well as for the survival of other living things. Many people are not sufficiently aware of how many of their activities have been and are being destructive to parts of the natural environment. How does air pollution caused by people, for example, interfere with the natural workings of the carbon dioxide and oxygen cycles? Why is it important to save and plant trees in our environment or to understand the vast oxygen input from the oceans of the world and what is happening when oceans are polluted?

Many of us know bits and pieces about the world around us but have not put them all together. It is hoped that this Sampler is helping you to fit them together and that this topic on living things, because of information on photosynthesis and soil, will be especially useful in this regard.

What living things are around you? If you are in a heavily urbanized area, you may think that few living things are there--but is this true? Let's take a close look.

Earlier you considered green growing things in pots, window boxes and yards. Not let's look at other places. Do you see a park, vacant lot, or some green space surrounding a factory or other building, or a school ground? Be aware of your feelings when you see these green islands or visit them. Let the colors of flowers or flowering shrubs lift your spirits. Enjoy the shade of a tree on a hot summer day. Watch birds, squirrels, or insects in and around trees and flowers.

Trees

Have you ever stopped to think of the many ways a tree affects the surrounding area?

"According to a forester friend, not only are trees beautiful, but they deaden sound, produce oxygen, consume carbon dioxide, filter chemical contaminants from the air, trap solid contaminants on their leaves, shade streets, and through the process of evaporation, can cool as much as 20 degrees the air beneath their canopies."

June, 1971, Urban Affairs Newsletter

Did You Know:

"A moderate-sized tree cools the summer air of a city as much as 20 average room air conditioners running 20 hours a day."

National Wildlife magazine, April-May 1973

Trees do all this? Perhaps we should respect them more. You may want to "adopt" a tree and observe it more closely all year round, perhaps keeping a diary of what you see. While you may have appreciated the shade in summer, have you looked at the beauty of your tree's bare branches in winter? Watch the tree each week from perhaps February on to see when the buds begin to swell, when it begins to have color. Observe ants and other insects on the tree. Watch birds fly to it--to look for insects or eat its seeds, to build a nest and feed their young. Do you know what happens to these birds, insects, and other animals in the fall and winter?

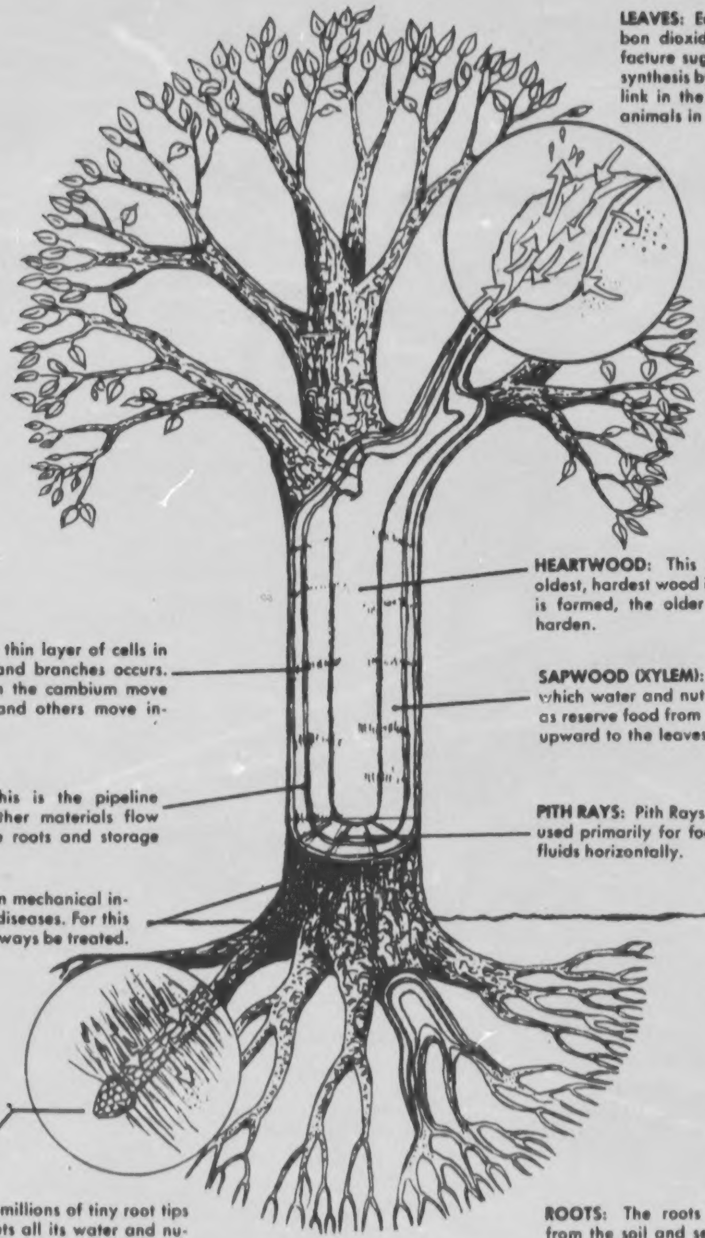
In many city vacant lots and yards the seeds of trees have dropped or blown in--were planted by nature. In city parks, however, most trees were planted. What kinds of trees grow in the various places?

In suburbs and small towns trees have generally been planted, not seeded naturally. You may be interested in learning about the many ornamental, fruit, and other trees you see around you. Are they the same as city trees?

In a forest, arboretum, or nature preserve, you may see many kinds of trees. Some may be in a climax community, which is the final group of plants and animals in an area that go on reproducing themselves instead of being replaced by other species. In prairie areas certain trees may grow, such as the bur oak.

Let's take time here to consider that great process--photosynthesis--which takes place in all green plants. It is one of the great chemical processes on earth, whereby hundreds of tons of carbon from the waste products of carbon dioxide combine with hydrogen from water to form basic food carbohydrates, at the same time releasing part of the oxygen to the air. This cycle, like the water cycle, is set in motion by energy from the sun. The exact processes by which plants manufacture food are still

HOW A TREE WORKS



LEAVES: Each leaf is a food factory that uses carbon dioxide, water and solar energy to manufacture sugar, the basic food for the tree. Photosynthesis by green plants is the basic, fundamental link in the food chain that feeds all plants and animals in the world.

HEARTWOOD: This supports the tree. It is the oldest, hardest wood in the tree. As new sapwood is formed, the older sapwood cells fill in and harden.

CAMBIUM: Cambium is the thin layer of cells in which all growth of trunk and branches occurs. Some of the cells formed in the cambium move outward to become bark, and others move inwards to become sapwood.

SAPWOOD (XYLEM): This is the pipeline through which water and nutrients from the roots as well as reserve food from the tree's storage cells travel upward to the leaves and branches.

INNER BARK (PHLOEM): This is the pipeline through which sugar and other materials flow down from the leaves to the roots and storage cells below.

PITH RAYS: Pith Rays are the areas of special cells used primarily for food storage and to transport fluids horizontally.

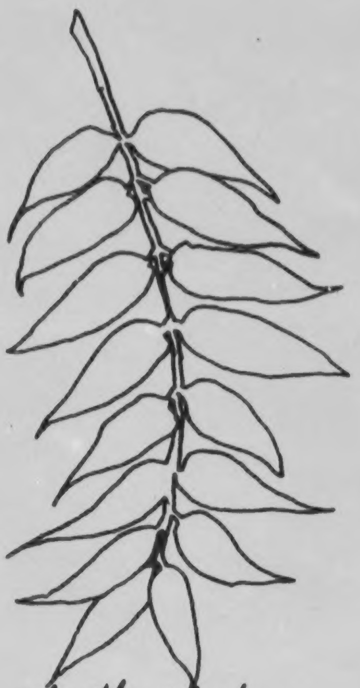
BARK: Bark protects the tree from mechanical injury and the entry of insects and diseases. For this reason, damage to bark should always be treated.

ROOT TIPS: Roots end in millions of tiny root tips through which the tree gets all its water and nutrients. Root tips are as essential to good growth as healthy leaves.

ROOTS: The roots collect water and nutrients from the soil and send them up the trunk to the leaves. They contain cells to store sugars, and also act as an anchor and support to hold the tree upright. The root system of a tree is usually longer and more branched than its top.

from Garden Talk, April - May, 1974
published by the Chicago Horticultural
Society.

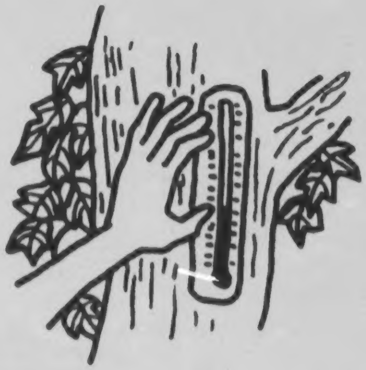
not known. We do know that without this process there would be no life on earth. We know that leaves use sunlight as energy and that leaves take in carbon dioxide and combine it with oxygen, which is supplied by water from the root system to produce food. This entire process is made possible by chlorophyll in the leaves of the plant. (See diagram of How a Tree Works, on preceding page.)


ailanthus leaf

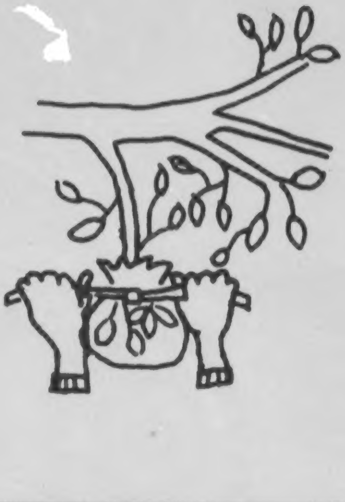
Plant identification, as such, may not seem particularly relevant to you, but learning which plants have adapted to a particular environment may be. For example, which trees have adapted to city air, usually containing more pollutants than air elsewhere? Perhaps you have seen a tree with long, fern-like leaves which grows rapidly in the spring and thrives in city backyards and vacant lots. It is the Ailanthus, or tree-of-heaven, one of the more common city trees. Look for its clusters of seeds. Another city tree easy to recognize is the sycamore, or plane tree. It has a unique bark pattern of large brown sheets and lighter areas, giving it a mottled appearance. It is also easy to see the sycamore's "buttonballs" of seeds high in the tree. How many seeds do you think one of these balls contains? With all these seeds, why are there not more sycamores in the city? Can you find other trees that are common in your city?

THINGS TO DO:

(See also the THINGS TO DO under the sections "Are Green Growing Things Nearby?", page 7, and "Open Spaces/Green Areas", page 171.)



- On a hot summer day, take the temperature in the sun a few inches off the ground, and in the shade of the tree, if possible sheltered from the wind. How much difference is there?
- Choose a shrub, tree, or small plant, on which the leaves are easily reached; cut out several squares of heavy paper and attach to several leaves; remove after about four days; discuss the lighter-colored spot where the heavy paper deprived the leaf of sunlight.
- Choose a woody plant to observe over several seasons; note the changes in early fall; does anything happen during the winter? What takes place in spring and summer?
- To learn about evaporation (respiration), tie a plastic bag around a few leaves of a tree; leave it for 20-30 minutes; remove the bag; what did the bag collect? As this water evaporated from the tree, the water took up heat, thus cooling the surrounding area.



- To see if trees absorb noise, compare noise on a treelined street to that on a street without trees but with about the same amount of traffic.
- If you see an up-rooted tree, examine the roots; think how the roots held the tree in the ground and how the root system absorbed minerals and moisture from the soil.

Plants

It is often difficult to remember that there is soil under the buildings and streets of a town or city, but we are reminded of the soil when we see growing things. What plants have you seen on your city walk? Some plants are unbelievably hardy. You might see dandelions, plantain, ragweed, asters, or goldenrod sprouting up in the smallest of cracks. They remind us that there is indeed soil beneath the cement or blacktop and that somehow the plant has been able to get the water and sun and soil nutrients it needs for growth.

You may want to grow your own plants from seeds, bulbs, and roots. You might try them in different kinds of soil, give them different amounts of water, put identical plants in sun and shade to see how they react.

THINGS TO DO:

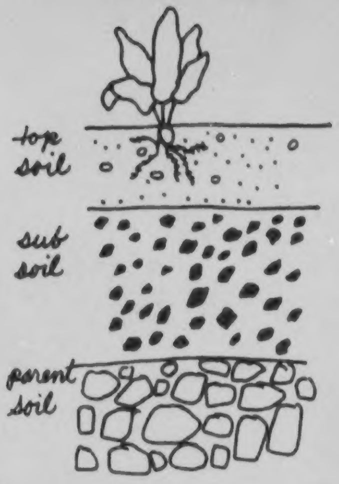
Grow Your Own Plants:

From seeds, bulbs, and roots.

- Examine cracks in a paved school yard; do you find moss? If so, notice the low, even growth and the velvet-like surface (remember,you can see much better with a magnifying glass); what else is growing in the cracks? How did they get there?
- Look along the edges of the school yard where there might be a wall or fence; do you see little piles of soil, leaves, seeds, and other debris that was carried there by the wind, or deposited into middens by earthworms? Are any plants growing there?
- Early in the spring take some soil, with nothing growing in it yet, into the house or classroom; keep it moist; what happens?
- Make a survey of a vacant lot or other site or part of it to learn what kinds of plants are predominant; if different kinds of plants grow in different parts of the lot, what conditions affect where the plants grow.

Soil

As we have become a more urbanized nation, many of us seem to have lost or never had an understanding of the importance of soil. It is vital for us to keep in mind that without soil, there would be no life. Food, of course, needs soil to grow, as well as sunlight and rain; and people, of course, need food for survival.



Let's think about soil. Soil is found in three layers (see illustration). Many midwestern states' soils were created by those vast ices masses, the glaciers. These masses wore down mountains and hills, breaking off rocks and grinding them into soil. When the last glaciers melted (perhaps 8,000 to 12,000 years ago), the soil, rocks and boulders they were carrying were deposited over the land. In the milleniums since the glaciers, lichens and other plants have helped change rocks to soil, the acids produced by these plants causing rocks to crumble. Changes in the climate and weather also cause rock particles to break loose. Soil and rock particles, as well as organic materials, have been worked up and down in the soil profiles by many animals, particularly ants and earthworms. Soil-making is a very slow process.

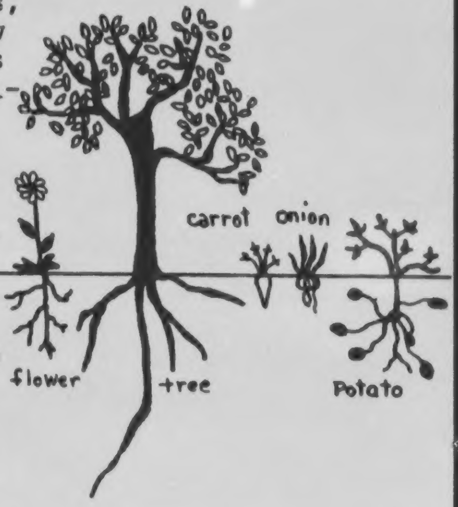
Did You Know?

That it takes 500-700 years to build up one inch of topsoil?

When we see plants struggling to grow where there are bare rocks or little top soil, we realize the importance of soil in holding plants in place and in providing water and minerals for the plant roots. While windblown topsoil may be hundreds of feet thick in some places, especially along large rivers, in other places it is only a few feet or even a few inches deep. The average depth on American uplands is seven inches. Think of our reliance on this relatively thin coating of our earth!

THINGS TO DO:

- Examine soil from different places with a magnifying glass; what do you see?
- Examine the roots and rootlets of different plants; compare what you see.
- Learn how earthworms loosen soil; look up the directions for making an earthworm farm or an ant colony box.
- Learn what soil bacteria (decomposers) do. Consider how plants, animals, and people each contribute organic matter to soil.
- Look for an excavation for a new house or a new cut along a highway or for a new road; try to find topsoil, subsoil, and parent soil.
- Learn about the conservation work performed by the Civilian Conservation Corps (CCC) in the 1930's.
- Examine a square foot of soil; what plants and animals and insects do you find? How are they interdependent?



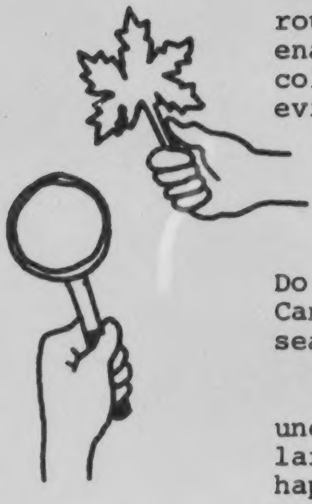
Special Research:

Learn the advantages and disadvantages of one-crop agriculture (monoculture) compared to crop rotation and strip cropping.

Learn about contour cultivation.

- Look for examples of erosion; consider the causes and possible remedies. (A school might get technical advice from the Soil Conservation Service of the U.S. Dept. of Agriculture or University of Illinois extension agents.) Make plans and carry them out to counteract effects of erosion.
- If you can scoop up a handful of forest soil (get permission to do this; then return the soil),you may see little life at first, perhaps an earthworm or a few ants. If you look more closely, you may see smaller creatures--ticks, spiders, and mites. And if you use a microscope, you open up a whole new world of living things! Most of the life of the forest floor is microscopic in size. The plants use the energy and basic substances that have been trapped in the decaying materials. Insect larvae, burrowing animals, earthworms, ants. and other creatures continuously tunnel in the soil, resulting in a gradual mixing of the topsoil and subsoil.
- Get a handful of soil from the edge of a pond and look at it as you did the forest soil.

Animals



Now let's look for signs that other animals are round and about. You may want a magnifying glass to enable you to see better the beauty, patterns, and color of tiny things. If you see any of the following evidence, what animal might have left it?

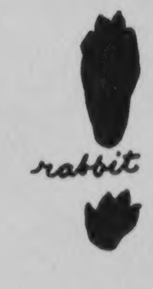
- hole in a leaf
- nut shells
- chewed branches of shrubs or trees
- web
- footprint
- leafy nest
- hole in ground
- feather
- casting

Do you find other signs that animals have been here? Can you think of evidence you might find in other seasons of the year?

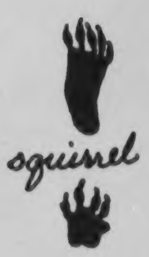
If you see a tree whose leaves have holes, look under the leaf for inchworms, or measuring worms (the larvae of Geometrid moths). Are there nut shells, perhaps under an oak tree, or on a stump or log? You may see a squirrel's leafy nest in the oak or holes high in the tree which squirrels may use for a winter home. If you see a low branch of a tree or shrub that has been chewed, perhaps rabbits or mice nibbled here, dropping bits of twig on the ground. In the winter you may notice these bits of twigs on the snow. If you find a web, look for the spider waiting for its prey.

If you want to investigate animal signs, especially footprints, you will need a good reference book.

Try the public library. What made the footprints? A dog? cat? rabbit? squirrel? bird? In the winter, if there is snow, do you see evidence that one animal caught another? There may be signs of a struggle. Or you may see footprints leading to a tree with holes that can be animal homes. Can you make up a story to explain the footprints?

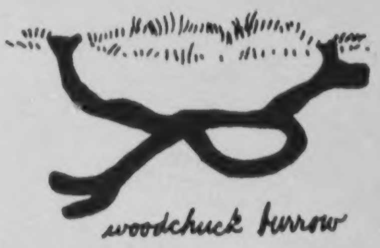


Where would you look for animal homes in the city? If you are not sure, try in trees, under eaves, on window sills, in vacant lots--and then try to think of more places to look. In trees you may find birds nests and holes that may be homes. You may find nests of birds and wasps on eaves and sills; spider webs can be found almost anywhere, even inside a building.



If you go to the woods in a forest preserve or nature preserve, look for holes of various sizes:

- a hole 8-10 inches in diameter may lead to the underground home of a woodchuck
- large holes up in trees may be used by raccoons
- nests high in trees may be made by birds or squirrels
- snakes do not dig holes, but some of them go into holes dug by other animals or into cracks or may burrow under soil or logs or rocky ledges to hibernate
- tall, dead trees may become "apartments" where red-headed woodpeckers chiseled out holes for homes and often taken over by starlings
- a 2-3 inch hole might be one of the entrances to a chipmunk's burrow
- a large hole at the base of a tree or around the roots of an uprooted tree may be a raccoon's home.



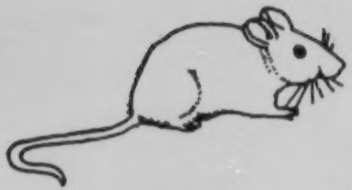
Cottontail rabbits build nests or "forms" in tall grass in a hollow in the ground in a brushy thicket.

Mice make a variety of homes. Some make burrows in the ground while others live in holes high up in trees or may take over a bird's nest.

You may see a large paper wasp's nest attached to a branch or a small one fastened to a telephone pole.

Instead of just clues that animals are nearby, you may see the animals themselves. If you see a squirrel in a woods or suburban yard, what does it eat? Is a city squirrel able to find the same food? If not, try to discover what it does eat. (Does this remind you of the Aesop's fable, "The Town Mouse and the Country Mouse"?)

Mammals Adapted to the City Environment

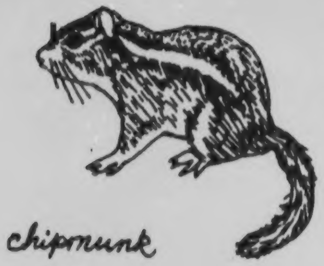


house mouse

The house mouse is disliked and feared because it carries disease and does damage, especially to packaged grains and cereals and to fabrics and paper.

The rat is even more feared because of the many diseases it may carry and damage it does to stored food.

Bats are common city animals that are rarely seen or rarely recognized at a distance. They fly at dusk or dark and because they are small, with a wingspan of 10 inches or less, they are often mistaken for a large moth. Most bats migrate southward in the fall, but some over-winter in buildings, hollow trees and caves.



chipmunk

Chipmunks and rabbits may live in city parks and other green areas. Along streams, muskrats, minks and even beaver are still found, even within urban areas.

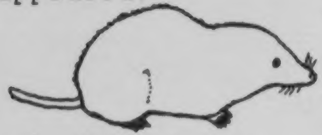
Raccoons and opossums may occasionally be seen, though they are more common in wooded suburban areas and forest preserves.

Deer (the white tail) are still present in most Illinois counties.

Moles and shrews may live in the city but remain well hidden. They may be discovered only when a cat catches one and brings it home, or you spot the pushup tunnels of the mole in a lawn or garden.

Something to Think About:

What mammals were in your area 150 or more years ago? Why have some disappeared?

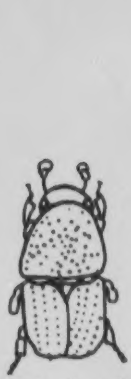


shorttail shrew

Insects and Bugs

Now let's consider the living things that are among the more numerous on earth: insects. You may be well aware of flies and mosquitoes, but what other insects can you find?

Insects can be found everywhere--below ground, under rocks, on top of and below the water, in leaf litter, in the air, on animals, fruits and trees and in buildings. Insects occupy particular niches in our environment. You may want to learn what these niches are. As you look around you may be aware of insects as food for birds and as decomposers. What other roles do they perform?



bark beetle

It is often easier to find insect signs than to find the insects, in spite of their numbers. If you are examining a dead tree or a rotting log, notice the tunnels under the bark. These may have been made by bark beetles and other beetles as they look for food and a place to lay their eggs. (Too many tunnels and holes, of course, will cause a tree to die if they cut the tree's food supply.) You may also find sow bugs, snails and slugs here as well as ticks, spiders, grubs, and eggs. Some of these animals can also be found under a rock or log or board. What are they doing?

A dead tree which is still upright is a good place to search for insects. Do you see beetles making small holes in the bark? Or evidence that they were there? Perhaps you find carpenter ants making tunnels in the wood.

You may observe those busy creatures, the ants, Or are you attracted by a buzzing sound? Bees are as busy as ants. Many people are afraid of bees, and while their sting can be painful, especially for people allergic to the sting, it is important to understand the essential role of bees and other insects in the pollinization of flowers.

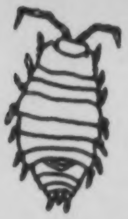
Look for ladybird beetles (ladybugs) which are easy to see because of their red or yellow color. They help plants (and thus humans) by eating aphids, those minute insects that suck plant juices. Can you see any aphids on plants?

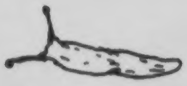
Common to city dwellers are cockroaches, silverfish and clothes moths, all found in homes and other buildings. Cockroaches also live in barns and fields. They eat all kinds of food and destroy rugs, clothing, and books. Silverfish, which especially like warm places, eat clothing and starch and glue from bookbindings and wallpaper.

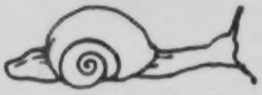
Spiders, too, are often feared--but such fears are unfounded because few, if any, spiders in this area are poisonous. Do some reading about the Black Widow spider and the Brown Recluse--these may be found over most of Illinois and are included in the "poisonous"list. To be safe, though, avoid touching spiders. Actually, spiders will usually run from you. Think how helpful they are in catching flies and mosquitoes in their webs. Daddy-long-legs (harvestmen) are relatives of spiders and should be given protection and understanding.

THINGS TO DO:

- ▸Look for ways insects use camouflage as a means of protection.
- ▸Under a low-power microscope, examine the mouths of different insects; can you determine how they eat? (suck, chew, and so on?)
- ▸Prepare oral reports or written papers about

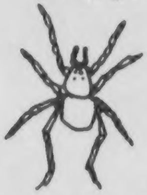

sowbug

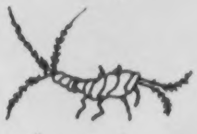

slug


snail

Be An Ant Watcher:

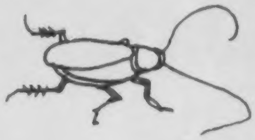
Watch those busy creatures carry sand grains or heavy insects. Look up a diagram of the underground parts of an ant hill. See what happens if the hill is disturbed very lightly on the surface - don't be unduly destructive of an ant mound. Ants will repair a mildly disturbed surface.


ground spider


silverfish

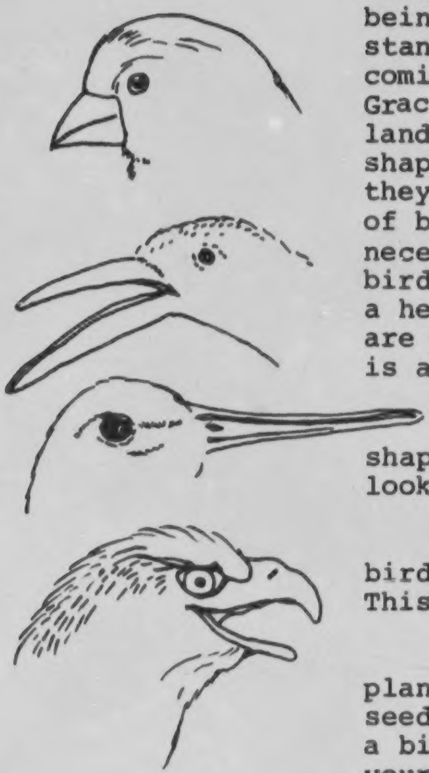
Special Research:

On... caterpillars, butterflies, moths, fireflies (lightning bugs)


Cockroach

some of the insects and spiders and other creatures we seem to dislike: mosquitoes, flies, ticks, spiders, chiggers.

Birds

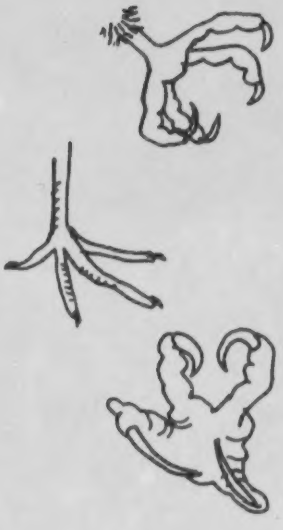


Perhaps you would like to concentrate on birds in your area. Are you a bird watcher? If not, you will be amazed how much pleasure these feathered beings can give you once you begin to watch and understand them. Listen to their songs, too. Unbelievable coming from some of the tiny birds? Watch their flight. Graceful? Fascinating to watch as they come in for a landing? You might like to learn to recognize them by shape, outline or flight; to learn what they eat; where they nest; what kind of nest they make. A good pair of binoculars, while expensive and not absolutely necessary, is a great help in seeing a distant songbird or a treetop visitor. A bird guide book is also a help in checking what you see. Pocket size guides are most convenient. An inexpensive 8x10 telescope is a good substitute for more expensive binoculars.

Do you know you can tell what a bird eats by the shape of its beak? And where and how birds live by looking at the feet and claws?

You may want to keep a record of what kinds of birds you see, where you see them, and the dates. This kind of record gets more interesting year by year.

You may want to attract birds to your yard by planting shrubs that bear fruit, by putting out birdseed in fall, winter and spring, by tempting them with a bird bath. A record of just the birds you see in your yard is fun to compare from year to year.



If you become interested in bird watching, you may want to join with others to hike in forest and field, in nature preserves and wildlife refuges to enjoy this hobby.

Some birds have adapted well to the city. While many suburban and country birds build nests in trees, city birds are not always able to find a tree. They have accepted window sills and ledges, roofs, gutters and eaves of buildings as nesting places. Can you find nests in other places? Country birds use twigs, leaves, and grass for nest construction. City birds use these materials when available, but also use other materials like string, candy wrappers, sandwich bags, long dog hair, or even nails and other bits of metal.

You may have seen pigeons, starlings, sparrows and robins in the city. Look for nighthawks. Learn how these "wild" things have become accustomed to life in a busy, noisy city.

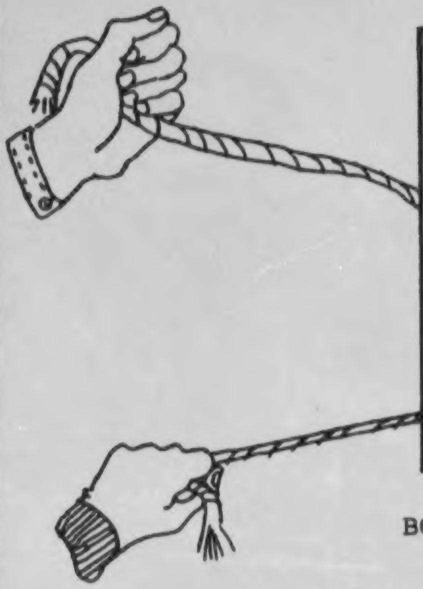
THINGS TO DO:

- ▶Learn about the programs of some organizations whose main purpose to to preserve birds and other wildlife.
- ▶Consider what effects on the environment a decrease in bird population would have--on plants, insects, worms, people, and so on.
- ▶Learn under what conditions some birds and other animals have become extinct or endangered; what can be done to prevent this?
- ▶Visit a bird or wildlife refuge.
- ▶See the geological and ecological exhibits of the Chicago area at the Chicago Academy of Sciences, 2001 N. Clark St. Open 10:00 - 5:00 daily; free admission. Phone (312) 549-0606. Learn about free nature films and travelogs.
- ▶Learn about the environmental education program for children and adults at the Field Museum of Natural History, Roosevelt Road and Lake Shore Drive. The program includes workshops, field trips and courses--for adults, young people, and family groups. An exhibit called "Man and His Environment" will open in 1975; watch for special programs in connection with this exhibit. For information on the programs, write to the Coordinator, Special Services, Department of Education, Field Museum of Natural History, Roosevelt Road and Lake Shore Drive, Chicago 60605.
- ▶Teachers already undoubtedly know about the Field Museum's Foundation programs for school groups; especially pertinent to the topic in this chapter are the Science Workshops on Ecology and the Science-Tour-Programs on Plants and Animals of the Chicago Region, Relationships between Living Things (on ecology), and Vanishing Animals. For information write: The Raymond Foundation, Field Museum of Natural History, Roosevelt Road and Lake Shore Drive, Chicago 60605.
- ▶In a classroom learn about food chains, food webs, and food pyramids. Then try these games.

Have you seen--the excellent Science Notes available to members of the Chicago Academy of Sciences on such topics as The Chicagoland Prairie and Indiana Dunes? Membership dues are $10/year.

WEB OF LIFE GAME

Individuals act the part of a certain living or non-living thing in a specific environment, as sun, tree, rocks; each one discusses his relationship to other things. Consider what they would like, what they would stay away from, what they might help, what would help them, what they would be indifferent to.



ANOTHER WEB OF LIFE GAME

Start with one thing in nature, for example, a tree. Have one child represent the tree and hold the end of a string. Have children suggest things the tree needs and represent them; i.e. sun, soil, water, each child taking one end of a piece of string and the "tree" holding the other end. Discuss things that depend on the tree. Have students represent them, always connecting with the string. After a time, depending upon the age of the students, cut the string in one place and discuss what might happen if the web were broken at that point for some reason.

BOOKS TO ENJOY:

Blough, Glenn. Discovering Insects. McGraw-Hill, 1967. Intermediate. $4.

Busch, Phyllis. At Home in Its Habitat. World, 1970. Intermediate. Over $5.

Busch, Phyllis. City Lots: Living Things in Vacant Spots. World, 1970. Primary.

Busch, Phyllis. Exploring As You Walk in the City. Lippincott, 1972. Primary. $4.

Busch, Phyllis. Exploring As You Walk in the Meadow. Lippincott, 1972. Primary. $4.

Busch, Phyllis. Once There Was A Tree. World, 1972. Grades 3-5.

Cohen, Daniel. Animals of the City. McGraw-Hill, 1969. Intermediate. $4.

Ferguson, Grace F. The How and Why Wonder Book of Wild Flowers. Grosset & Dunlap, 1962. $1.50.

Fox, Charles P. When Autumn Comes. Reilly and Lee, 1966. Primary. $5.

Fox, Charles P. When Spring Comes. Reilly and Lee, 1964. $5.

Fox, Charles P. When Summer Comes. Reilly and Lee, 1966. $5.

Fox, Charles P. When Winter Comes. Reilly and Lee, 1962. $5.

Gannon, Robert. What's Under a Rock? Dutton, 1971. Intermediate - up $5.

George, Jean. All Upon a Stone. Crowell, 1971. Grade 2-5. $4.

George, Jean. The Hole in the Tree. Dutton, 1957. Intermediate - up.

George, Jean. Lives of an Oak Tree. Grade 5-up.

George, Jean. My Side of the Mountain. Dutton, 1959. Intermediate.

George, Jean. *Who Really Killed Cock Robin?* Dutton, 1971. Intermediate-adult. $5.

Graham, E. H. *The Land Renewed*. Walck, 1968. Intermediate-adult. $5.

Lubell, W. *See Through The Forest*. Harper & Row, 1956. Primary. $4.

Lubell, W. *Tall Grass Zoo*. Rand-McNally, 1960. Primary. $4.

Mason, George. *Animal Homes*. Morrow, 1947. Grades 5-9. $4.

Mason, George. *Animal Tracks*. Morrow, 1943. Grades 5-9. $4.

May, Julian, *Why Plants Are Green Instead of Pink*. Publication Associates, 1970. Grades 6-9. $5.

Polgreen, John and Cathleen. *Backyard Safari*. Doubleday, 1971. Grades 1-7. $5.

Pringle, Laurence, *Discovering the Outdoors*. Doubleday, 1969. Grades 3-8. $5.

Pringle, Laurence. *From Field to Forest: How Plants and Animals Change the Land* (ecology) World, 1970. Intermediate-adult. $5.

Russell, Helen Ross, *City Critters*. Meredith Press, 1969. Intermediate-adult. Under $3.

Schwartz, George I. and Bernice S. *Life in a Log*. Natural History Press, 1972. $5.95.

Selsam, Millicent. *Birth of a Forest*. Harper and Row, 1964. Intermediate - up. $4.

Wasson, Isabel B., *Birds*. Follett, 1963. Grades 2-4. $1.50.

CURRICULUM MATERIALS:

National Audubon Society, *A Place to Live*. Urban ecology unit for 4-5 grades. Student manual 75¢, teacher's manual $1.50. Write Educational Services, National Audubon Society, 1130 Fifth Avenue, New York, N.Y., 10028.

Russell, Helen Ross. Soil: *A Field Trip Guide*. Little, Brown, 1972. Primary. $4.

Russell, Helen Ross. *Ten Minute Field Trips*. J. A. Ferguson, 1973. For teachers. $7.

Russell, Helen Ross. *Winter: A Field Trip Guide*. Little, Brown, 1972. Primary. $4.

Swan, Malcolm D. (editor). *Tips and Tricks in Outdoor Education*. 1970. Available from The Interstate Printers and Publishers, Inc. Danville, Ill. 61832.

(Also see list of Books to Enjoy at end of chapter on "Open Spaces/Green Areas".)

All That Garbage and Trash

For many Americans the solid waste problem begins and ends with the large container beside their back door--but in reality the problem is much greater. People have always had to get rid of wastes. The trouble now is that more people than ever before are throwing away more wastes than ever before.

Americans throw away 125 million tons of solid wastes annually. These wastes include at least:

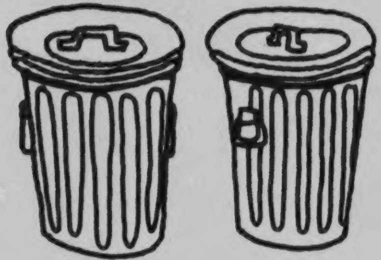
60 billion cans
36 billion bottles and jars
180 million tires
58 million tons of paper
8 million television sets
4 million tons of plastic
over 1 million abandoned cars

Did You Know?

In 1920, 2.7 lbs. of solid wastes per person per day were produced; in 1970, the figure was 5.3; it is estimated that it will be 8.0 lbs. by 1980.

The total annual solid wastes in the U.S. are equivalent in size to a glacier 81 yards (10 stories or 243 feet or almost 75 meters) high and one mile (2.6 kilometers) square!

Let's bring solid waste closer to our lives:



4 soft drink or beer cans a day from a family may not seem like much, but think of the space 1,460 cans a year take up and the waste of metal if the cans are buried in a landfill;
5 lbs. per person per day may not seem enough to be concerned about, but consider this for a family of 4 for a year--
4 people X 5 lbs. X 365 days equals 7,300 lbs.
OR OVER 3 1/2 TONS!!

These solid wastes have to be taken care of, or managed. There are several steps in such management:

storage }
collection } where the real problems are
processing } state agencies know what companies
disposal } are involved and regulate them

While some individuals separate bottles, cans, and newspapers from the rest of their solid wastes and take them to a recycling center, by far the greatest number of people do not (or, realistically, could not if they so desired because no center is near enough). Moreover, it takes space to store the used materials at home until the supply is large enough to make a trip to a recycling center worthwhile from an energy/resource cost/benefit standpoint.

Collection of solid waste is a problem in some areas, due partly to high cost, but it can be handled efficiently. Some communities have private scavenger service. Elsewhere municipalities contract with scavengers for pickup at public expense.

One expert at a state agency sees the trend in collection of solid wastes to one man using a side-loading vehicle; with curbside, once-a-week pickup of trash placed in plastic bags. He said plastic bags are acceptable for such disposal in a landfill because they slow down leaching (the washing out of soluable materials by ground water), a concern when materials are toxic.

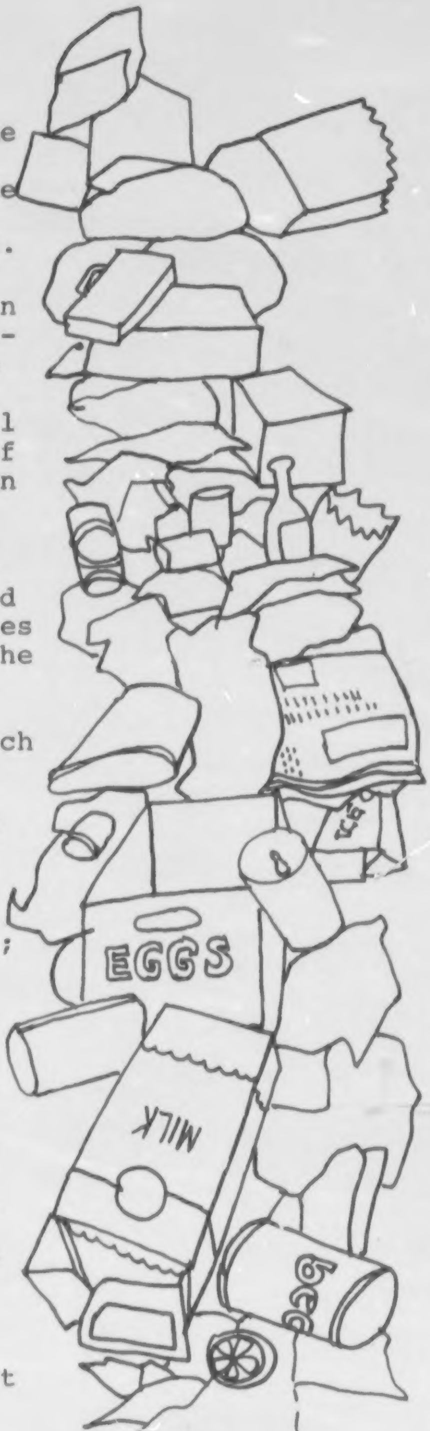
Processing of solid wastes is done in different ways: compacting, incineration, separation and recycling of a few materials, burning of some wastes for fuel, etc. Certain scavenger trucks compact the wastes, reducing the volume considerably. Incineration is a process of burning refuse within an enclosure. Because incinerators do not require much space, they can be located in cities. Since over half of municipal waste is organic, the volume of non-burnable refuse can often be reduced to 15% by this method of processing, resulting in much less refuse to transport to a landfill.

Unfortunately, most incinerators are obsolete; they do not meet the present clean air standards. They may waste valuable resources.

The new incinerators, which can also produce power, are efficient and almost free of pollution, hence environmentally acceptable. Recyclable material can be separated out before incineration.

What about disposal? Until recently most refuse was deposited in open dumps, where it either rotted or was burned. Such dumps often caused air and water pollution, attracted disease-carrying rodents and insects, and presented a fire hazard.

Open dumping has been prohibited by law almost everywhere. Illinois has some of the strictest solid waste management regulations in the U.S. In October, 1974, there were about 400 licensed landfill sites in the State compared to 2,000 dumps previously in operation. In sanitary landfills



refuse is deposited daily in a depression (or on a hill--See section on Garbage and Trash in the chapter "Wastes as Resources") at a landfill site, spread, compacted, and then covered with six inches of soil at the end of each day.

Several of the advantages of landfills are:

- many soils are able to absorb and neutralize polluting substances
- organic substances are broken down in the soil and the nutrients used by plant and animal life
- soil acts as a filter for many inorganic chemicals
- covering the refuse keeps litter from blowing around, discourages vermin, and prevents odors and open fires
- a well-designed, located, and managed landfill is not unattractive
- when completely filled the well-designed and managed landfill site can be used for parks or golf courses or even housing areas with no trace of the refuse deposited underground.

How is the disposal of solid wastes handled in your community? (You might call the town hall to ask these questions.) How often is the pickup? Where are the garbage and trash taken? (To a sanitary landfill? an incinerator? somewhere else?) How far is it taken? How heavy are the trucks? You might discuss the impact of these heavy vehicles on residential streets and on highways. What might happen in the future as the nearby sites are filled, for example? How do people feel about living near a sanitary landfill or incinerator?

Let's remind ourselves of the following vital fact stated in the preface of a 1969 National Academy of Sciences Study, Policies for Solid Waste Management:

> Matter can neither be created nor destroyed. Man processes and uses matter. In so doing he may change its chemical form or alter its physical state; but in some combination of gases, liquids, or solids, all of the original material continues to be part of the world about us.

With this in mind, what about the materials that are buried in the landfill? Do they quickly enrich the soil? According to a mini-editorial in the Chicago Daily News, October 28-29, 1972:

- a thin aluminum can will break into dust in 500 yrs.
- an old-fashioned "tin" can will do this in 100 yrs.
- a container of commonly used plastic disintegrates 95%, if it is buried, in 350 yrs.
- a container of commonly used plastic disintegrates 95%, on top of the ground, in over 350 yrs.
- glass containers probably last indefinitely.

Olives
in the
Forever Yours
Jar

What are reasonable alternatives to sanitary landfills? Instead of being buried, can solid wastes be put to use? First of all, it cannot be too strongly stressed that recylcing is very complex. Mechanical processes for recycling still must be perfected. Labor costs are high. Ready, dependable markets need to be developed. But people who think in terms of the concept of Spaceship Earth--a closed system whose only resource being replenished from outside is sunlight--urge that we think and plan for reuse and recycling of materials. While it is common to recycle paper, what about metals and other resources that are in solid wastes? Some European cities are making electricity and heat from refuse, and the Dutch have compost factories which produce fertilizers from the organic content of garbage. (See section on From Garbage to Electricity in chapter "Wastes as Resources.")

There are drawbacks to landfills, too. Suitable land near cities may be expensive and difficult to find. As more distant sites have to be used, transportation costs become higher. Furthermore, unless separation occurs, valuable resources are buried in landfills and not recycled, thus being forever unavailable for people's use.

Some experts see regionalization--a county landfill and/or incinerator, for example--as the answer. Such large-scale management of solid wastes make it economically feasible to recycle materials, and the environment gains.

Besides problems of disposal and of wasted resources in solid waste, do you see such wastes polluting land or water? You may observe that inadequate storage and collection practices affect health by providing breeding places for flies, cockroaches, and rats, which could then enter nearby homes as

well as look unsightly. This problem may not occur on your farm or in your neighborhood or community, but there may be cans, bottles, paper and plastic littering the streets, sidewalks, or yards--evidence that people have been there. In some areas, you might see liquids draining from open dumps, feed lots, or mine debris piles which may pollute water.

Of increasing concern to some individuals is the amount of solid waste people produce. They object to the excessive packaging on pharmaceutical items, fresh produce, meat, and other products. American consumers paid about $25 billion in 1966 for packaging, 90% of which was discarded. Moreover, advertising seems to have sold consumers on the convenience of throw-away containers. What about such containers in terms of litter, disposal of these wastes, high purchase cost to the consumer, and waste of resources from which they are made? About one-half of all food and beverage containers are used for beer and soft drinks. The purchase price of soft drinks in throw-away glass bottles is 30% higher than those in returnable containers. Add to that the costs of extra trash pickup and greater landfill costs this causes. We may be creating economic activity by over-packaging, but we are using non-renewable resources. What are the tradeoffs? Are there really any?

Special Research:

Ways materials are being recycled.

THINGS TO DO:

Recycling and Disposal

- What about returnable bottles? Check into Oregon's tough beverage container law that outlaws snap-top cans and throw away bottles, requires 5¢ refunds on all carbonated beverage containers except for short-necked 12-oz. beer bottles, on which 2¢ is paid. (A "Bottle Bill Progress Report" is available from the Oregon Environmental Council, 2637 SW Water Street, Portland, Oregon 97201 for $1.50.)
- Check to see if one-way bottles have been perfected which, when burned, will have little or no residue and release no pollution to the air; what happens to them in a landfill?
- Learn about the way garbage and trash were used to make a recreation area with a "mountain" and lakes in the Blackwell Forest Preserve. For a kit, call 629-5700 or write Forest Preserve District of DuPage County, 881 W. St. Charles Road, Lombard 60148.
- Find out whether shipping costs are still higher for used materials than for raw materials; how does this affect recycling costs?
- Check into recycling centers in or near your town; is this done on a large enough scale to save appreciable amounts of resources?
- Observe the solid waste your family is throwing away; could some objects be repaired and reused by your family or by others?
- At school a team of volunteers might sort one day's trash (after being dumped together) into such piles as garbage, paper, metal, glass, plastic; what difficulties do they find in sorting the trash? (Note: Be cautious and have adult supervision. Wear gloves. Could be dangerous!) Should there be containers for the different wastes? Should students be asked to sort as they throw away? What difficulties might this entail? What difficulties might you see in sorting trash for a city? What about difficulties of sorting after waste is compacted?

For several years legislation has been proposed in the Congress that will give recycled materials the same tax breaks and freight rates that virgin materials enjoy. In July, 1975, it had not yet passed. Watch for future developments.

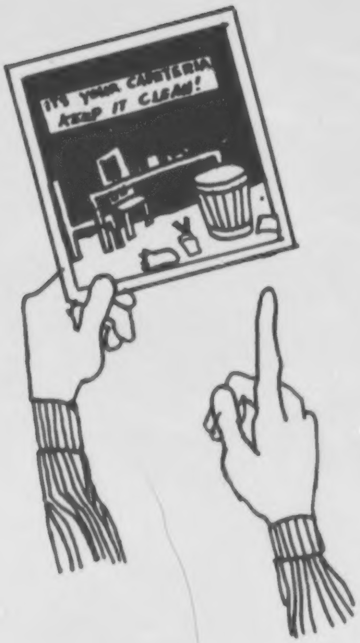
Please DON'T LITTER!

Land Pollution

- Learn what litter is, where it is, how it affects an area, and what can be done about it; what is an individual's responsibility?
- A teacher may take a class to pick up litter out

doors, perhaps making three-dimensional posters using some of the litter. This exercise might be done on a regular basis, alternating with other classes. NOTE: if done too often, children are turned off.

- If a stream near you needs to be cleaned up, individuals may want to contact community organizations to get them interested in helping. A teacher may want to get interested students involved. Careful planning is required. Equipment, such as high boots, rakes, shovels and gloves, is important. In some communities arrangements can be made with the town for trucks to pick up the junk cleared from the stream. Some of the trash might be saved for a display at your school or local library and/or to make into a sculpture!
- For a class project, a nearby area might be kept clean (flowers and trees planted, too.) Check out liability before beginning.
- Use a camera to take pictures of litter and wastes in various areas: along streets, at school, in a school cafeteria, etc. and in school yards before and after clean-up.
- If you see inadequate storage and collection practices, why not try to locate community organizations which are working on this problem and work with them? Could a member of such an organization speak to your class or a group you belong to?



Have you heard that some people think that waste or destruction of natural resources is stealing --from future generations?

MISCELLANEOUS:

- Write a letter or talk to the manager of your local supermarket giving reasons why he should cut down on excessive amounts of styrofoam, cardboard, and plastic packaging.
- Send some of the excessive packaging from products you recently purchased to the manufacturer with a covering letter explaining your objections to such packaging.
- Buy beverages in returnable bottles; where possible, exclude goods in throw-away containers from your shopping list.
- Take your own reusable tote bags to the store; cut down on use of paper bags and wrapping paper.

- You may want to dramatize the solid waste problems in your community by planning a photo exhibit depicting solid waste, perhaps showing the route solid waste takes from your home to its final resting place.
- You may want to urge an organization of which you are a member to try and arrange a visit to a sanitary landfill.
- If you have a local League of Women Voters organization, contact them for information, perhaps setting up a public information meeting on solid waste.
- To cut down on yard wastes, try composting. See section on Composting in the "Wastes as Resources" chapter.

BOOKS TO ENJOY:

Blake, Peter; God's Own Junkyard. Holt, Reinhart and Winston, 1964.
Hilton, Suzanne; How Do They Get Rid of It? Westminster, 1970.
Illinois Institute for Environmental Quality, 309 W. Washington, Chicago 60606, 793-3870.
Directory of Markets for Recyclable Materials and Directory of Neighborhood Recycling Centers in Illinois.
Keep America Beautiful, Inc., 99 Park Ave., New York, N.Y. 10016.
Environmental Action Starts Here. A Youth Group Leader's Guide.
Litter Prevention: An Aid to Conservation.
Organizing an Anti-Litter Project With Steel and Pails
Establishing a Citizen-Sponsored Reclamation Center.
Leaf, Munro; Who Cares? I Do! Lippincott, 1971. primary. $1.99.
Rodale Press; Recycling. Educational Services Division, Emmaus, Pa. 18049. $1.50.
Schatz, Albert and Vivian; Teaching Science With Garbage. Rodale Press, Emmaus, Pa. 18049. for teachers. $1.50.
Shanks, Ann Zane; About Garbage and Stuff. Viking, 1973. primary. $5.95.
Smaridge, Norah; Litterbugs Come in Every Size. Golden Press, 1972. primary. $1.00.

What Do You Hear ?

Walk around your neighborhood and concentrate on listening. What do you hear? Did you say "sounds" or "noise"? Is there a difference? Noise can be called unwanted sound and is usually excessive. Sounds below 50 decibels are hardly ever called noise. But people differ about what is "wanted". Some of today's music, for example, may be noise to older people but the right "sound" for young people. People also differ in their reactions to the pitch of sounds.

The characteristics of pitch, irregularity, and intensity (loudness), which is measured in decibels, are what make sounds most annoying. As you listen, be aware of the pitch, irregularity, and intensity of the noises you hear. (For simplification from now on the term noise will be used without distinction as to decibel level.) At some point you may want to classify the noises into the categories of: Home or Inside/ School/ Community or Out-of-Doors/ Industrial.

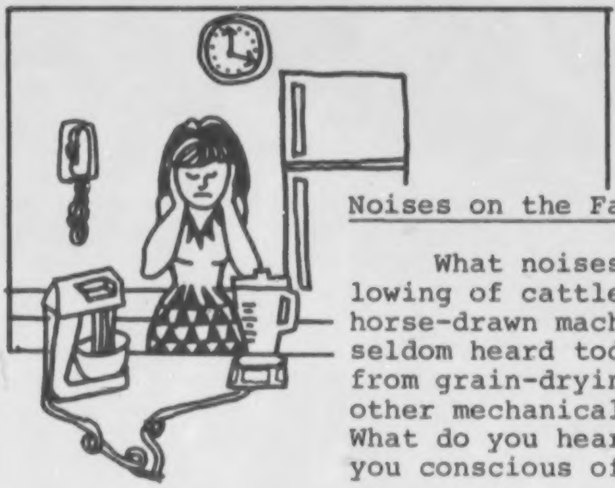
The following questions may help you think about the noises.

- ▶Define "decibel" and prepare or copy a rating chart form. (See page 72-1.)
- ▶Are any noises natural, or are they all man-made?
- ▶Are some noises more pleasant than others? Are any particularly unpleasant?
- ▶Are some irregular? Are they more irritating than regular noises? Why?
- ▶Which noises are necessary? Which unnecessary?
- ▶What types of areas are near the major sources of noise?
- ▶Do you think the noises you hear would be different at different times of the day?

You may want to draw a map of your community and locate residential areas and recreation areas. (If you are including a large area, you might get a map of your community from the Chamber of Commerce or a local bank.) Color code the areas of greatest noise (red-very noisy; yellow-noisy; green-quieter). How close are these areas to the residential and recreation areas? What are the problems of various noises to people who are nearby?

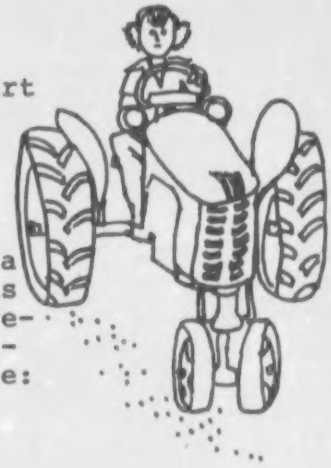
Noises in the Home

Pictures of noisy objects in homes might be collected or drawn and grouped by level of noise, as faint, moderate, loud, etc., using the table of sound levels in this chapter. You might discuss questions like those above. As more and more appliances have appeared in our homes to make work easier, the noise level has become greater. The kitchen is the noisiest room in the house because it is so mechanized and its walls and cabinets have hard surfaces off which noise bounces easily to cause reverberations. It would be a challenge to design kitchens which cut down noise.



Noises on the Farm

What noises can be heard on a farm? The lowing of cattle? The rustle of corn? The horse-drawn machinery? Such quiet sounds are seldom heard today on farms where louder sounds from grain-drying equipment, tractors, and other mechanical equipment may drown them out. What do you hear when you are on a farm? Are you conscious of loud noises?



Noises in Your School or Place of Work

Questions and suggestions from the preceding part of this section may apply, or add your own.

Why Is Anyone Concerned About Noise?

A teacher might make a sudden loud, unpleasant noise--crashing a ruler or book on a desk, dropping a metal object, etc.--and then discuss how the students feel, perhaps listing their physical and emotional reactions. When hearing any sudden noise over 70 decibels, people react as if to danger and can experience:

- a faster heartbeat
- drying of mouth and tongue
- dilation of pupils
- loss of skin color
- muscles that tighten or contract
- constriction of small blood vessels
- upset stomach
- increase in sweating
- anger, anxiety, and irritability.

With older or more mature students, there might be discussions of possible consequences of the above reactions, such as the eyestrain and headaches suffered by people who do exacting work, i.e., watchmakers and surgeons, when noise causes their eyes to constantly change focus. Research has shown that although people think they become used to a noise, their bodies do

not, and in time muscles, nervous system, and heart are taking a strain as well as hearing acuity becoming affected. Furthermore, it has been found that noises which did not awaken sleepers did, however, produce fatigue.

You might explore possible consequences of irritable people at school, at work, at home, driving a car, bus or train. You may want to discuss the following facts:

- people suffering from heart disease, asthma, ulcers, or stomach trouble can become sicker because of noise
- noise causes mistakes in work
- noise-interrupted sleep can have a damaging effect on sick or old people
- noise over a period of time can cause deafness--up to 16 million Americans were estimated to be working under literally deafening conditions.

You may want to examine with young people a statement that loud music may be hazardous to your hearing.

Some people say that during our private time when both our bodies and souls would benefit from peace and quiet, we are still surrounded by noise--perhaps background music, traffic noise, power mowers, and so on. What do you think?

What Can Be Done to Eliminate or Cut Down Major Sources of Noise?

Make a list, perhaps using the aforementioned categories of Home or Indoor/ School/ Community or Out-of-Doors/ Industrial Noises. Many people know that:

- drapes, carpeting and upholstery are used in homes, schools, and offices to muffle noise.
- special (acoustical) tile in ceilings and walls is used to absorb noise
- ear plugs, ear muffs, and even helmets are worn to protect hearing by workers in noisy jobs (as at construction-demolition sites and airports, both particularly noisy areas).

But did you know that:

- trees and shrubs can be planted to absorb both the noise and carbon monoxide from traffic
- busy streets, highways and even railroads can be sunk between earth embankments, reducing traffic noise up to 15 decibels in the immediate area
- buildings can be well-insulated when they are built (Although it adds two to ten percent to the total cost of the building, it also increases the value of the property.)

SANITATION

- quiet steel garbage cans are being made that make a dull thud instead of a sharp clang when dropped
- mufflers can be put on riveters, pneumatic drills, air compressors, pile drivers, and all kinds of excavation and demolition equipment, which are among our noisiest machines
- noisy machines can be walled in so their noise does not bother the entire factory, and the operators can wear plugs, muffs, and/or helmets
- noisy industries can be confined to one part of town
- airports can be placed far from towns and air traffic routed so planes do not pass over residences when they take off and land
- zoning laws can be passed to maintain an industrial buffer zone between airports and residential areas.

Further questions can be asked regarding eliminating or cutting down noise, such as--

Which sources have to be tolerated?
Which sources can be reduced through technological advances or planning procedures?
Which sources can be eliminated only by removal of the source?

One source of noise problems that is often overlooked is that of the individual noisemaker. Thoughtless individuals are bombarding others with over-loud radios, cars, motorcycles, power equipment, and amplification in general. Consideration or just plain courtesy to other people will help minimize this problem. In a classroom you may want to discuss how noise is inflicted on others who may be made distressed by it. What can be done?

HOORAY
WHIRR
RING
BANG
STAMP
TAP TAP

Did You Know:

That in Europe some countries have set a noise limit of 30 decibels for residential areas at night?

Noise seems to be much more serious than most people realize. It may encourage you to know that there is presently a developing technology to bring noise under control or eliminate it, at not excessive costs. Noise prevention can be marketed, as with quieter apartments and noiseless kitchen equipment. In New York, Chicago, and elsewhere, citizen groups have worked for anti-noise laws. Does your community have an anti-noise law? Do you think there is the need for one? What could you do to interest others in working to get such a law or ordinance passed?

How would our environment change if most of us began to

THINK QUIET ?

"In July, 1971, the Northeastern Illinois Planning Commission published its study* of the impact of aircraft noise upon communities surrounding O'Hare Airport... By 1975, if current trends continue, half a million persons will live in homes seriously impacted by noise around O'Hare. Quieter aircraft engines and changes in approach and take-off altitude would reduce the noise impact much more than any land use change, NIPC showed."

*a digest of this Metropolitan Aircraft Noise Abatement Policy Study: O'Hare International Airport, September, 1971, is available from the Northeastern Illinois Planning Commission 10 S. Riverside Plaza, Chicago 60606.

Other airports may have less of a problem than O'Hare due to much less air traffic, but airport noise seems to be a growing problem. The organization N.O.I.S.E. (National Organization to Insure a Sound-Controlled Environment) was established "to combat the growing menace of noise pollution caused by jet airplanes." For information on its purposes, accomplishments, and cost of membership, write: N.O.I.S.E., P.O. Box F, College Park, Georgia 30337.

BOOKS:

Aylesworth, Thomas G.; This Vital Air; This Vital Water; Man's Environmental Crisis. Rand, McNally, 1968. Intermediate-up. Contains two chapters on noise.

Elkin, Benjamin; Loudest Noise in the World. Viking, 1954. Fiction for young children, but anyone can enjoy. $3-5.

Hutchins, Carleen Maley; Who Will Drown the Sound? Coward, McCann and Geoghegan, Inc., 1972. Primary.

Jones, Claire, et al; Pollution: the Noise We Hear. Lerner, 1972. Jr. high - up.

McGovern, Ann; Too Much Noise. Houghton-Mifflin, 1967. Primary. $3-4.

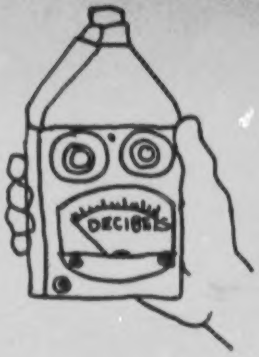
Navarra, John Gabriel; Our Noisy World. The Problem of Noise Pollution. Doubleday, 1969. Grade 6 - up. $4.95.

Perera, Thomas & Gretchen; Louder and Louder: The Dangers of Noise Pollution. Franklin, Watts, 1973. Grades 3 - up. $4.95.

U. S. Dept. of Transportation. Transportation Noise and Its Control. 1972. Available from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. 85¢ postpaid.

SOUND LEVELS

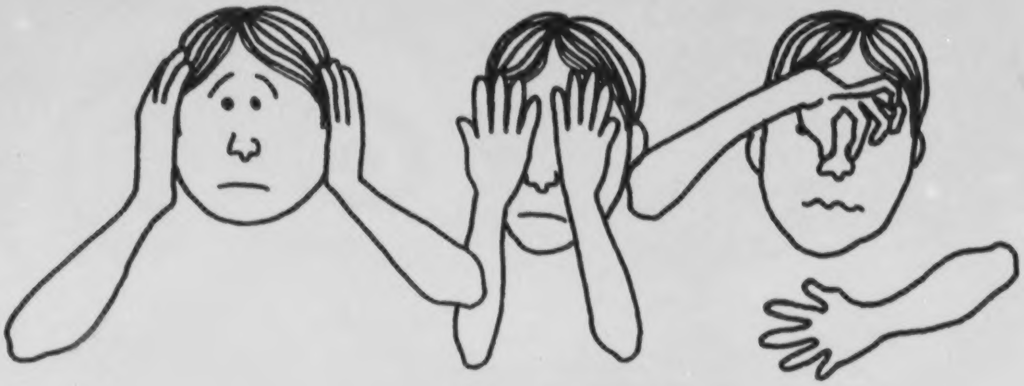
(taken at distances you usually hear them)



Decibels			Common Sources
180 170 160 150 140			electric shovel drill
130 120	ear drum may rupture strong ringing sensation in ear	physical damage	jet plane taking off shot gun blast riveting on steel plates air raid siren
110 100	perceptible ear discomfort	deafening	amplified rock band jet airport accelerating motorcycle loud auto horn siren circular saw
90 80	very annoying work efficiency decreases; errors increase continued exposure causes a loss of hearing	very loud	heavy street traffic freight train heavy truck power lawn mower inside subway train baby crying in same room garbage collection
70 60		loud	average radio vacuum cleaner alarm clock washing machine city school playground toilet flushing air conditioning
50 40	normal conversation	moderate	quiet home quiet street refrigerator suburban playground air conditioning
30 20	whisper	faint	watch ticking library
10 0	just audible	very faint	sound-proof room breathing rustling leaves

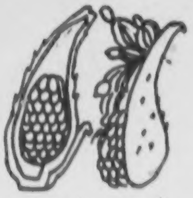
Beauty Around You

As we learn more about environmental problems, it is often easy to be aware of the degraded parts of our environment. Noise assaults our ears, litter offends our eyes, air pollution annoys our noses and perhaps eyes, and so on; we should not overlook these aspects of environment and just accept them.



However, somehow in the rush of our lives many of us have ignored the beauty in everyday things. We do not seem to realize that while beauty adds to our enjoyment, it is often needed for our survival. We seem to need help in learning to observe thoughtfully and sensitively, both the natural and man-made aspects of our world. What colors do you see around you that you like? What shapes? What patterns? Spaces? Sounds? How are they pleasing to you?

Do you enjoy the different seasons and their changes? Do you marvel at the reawakening of nature in the spring? Observe the buds swelling and opening into leaves or flowers. Notice the various shades of green and other colors and how the colors in nature complement each other. Has your heart been gladdened by a splash of color from one small plant?



milkweed

In summer do you notice the play of light and shadow caused by trees and shrubs? Texture of buildings? In autumn do you search out areas that have the colors of gold, brown, scarlet and crimson? In winter do you watch the snow for drifts, animal tracks, a deadening of the noises in the streets and observe the bare branches and the patterns they make? Have you seen delicate weeds? And dried seed pods? Perhaps you have been fascinated by the fast changing colors of sunsets, but have you also been up to watch

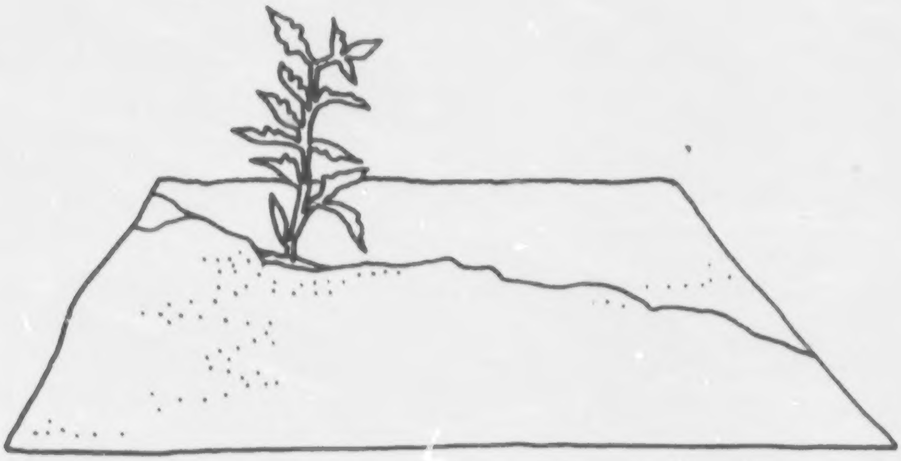
milkweed seed

the sun rise (and hear the early morning sounds)?

Have you watched the endless variety of clouds? Puffy, billowy clouds. Vast thunderheads that attract and threaten at the same time.

Search the sky beginning at dusk--looking at a skyline against the darkening sky in city, suburb or country. Watch the moon and stars gradually appear, filling you with awe as you ponder how far away they are. See low-hanging clouds covering the lighted tops of skyscrapers. Watch the fog or mist swirl in from Lake Michigan or from a low area, like the "cat's feet" described by Carl Sandburg in his poem, "Fog".

Have you seen birds soaring and moving with wind drafts, or going through their mating dances, or feeding their young? Have you seen plants growing in cracks so tiny you would never have thought there was any soil there? Have you watched ant hills and their busy occupants? Look at spiderwebs festooned with dew or raindrops.

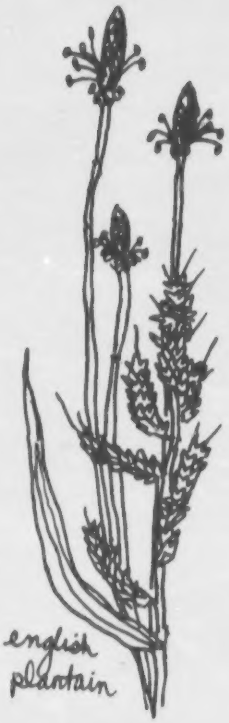


There is also the beauty and variety in man-made structures--as well as monotony and drabness. If there is monotony, can you do anything to change the situation? ("This topic is expanded under "A Close Look at Buildings Nearby")

When you see unsightly litter, do you pick it up? Do you look for litter baskets? Do you urge others to gather up what they find or not to throw it down in the first place? Are the waste containers in your park emptied regularly? If not, why not? What do your local officials say about this problem? Certainly people feel less like picking up litter or not throwing it down if the trash barrels are overflowing.

Think of one way you would like to add to the beauty around you. Can you do it alone? If not, can you find a group that is working on the problem?

Once you become more attuned to beauty around you, you may be surprised at what you had been missing.



THINGS TO DO:

- Keep a sketch record of tiny things, colorful things, things whose shape you like, and so on.
- Keep a record of new things you notice, perhaps year-round.
- Jot down a few words or phrases or perhaps a poem or Haiku about some of the things you see.
- Compare littering to throwing money out of a pocket (taxes) to pay people to pick up trash and litter.
- Collect dry weeds and make an arrangement.
- Look for activities with snow and shadows.

IT IS NOT FAR

by

Sara Teasdale

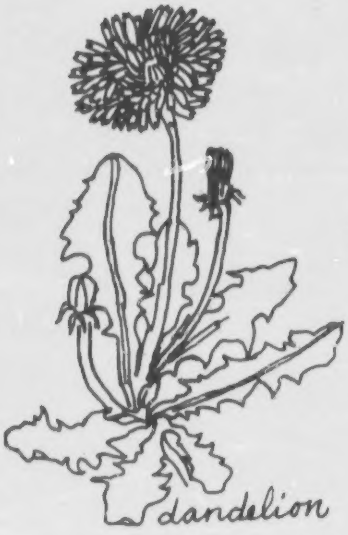
Stars over snow,
  And in the west a planet
Swinging below a star--
  Look for a lovely thing and you will find it,
It is not far--
  It never will be far.

(Copyright 1930 by Sara Teasdale Filsinger; renewed 1958 by Guaranty Trust Company of New York, Executor)

A BEAUTIFUL BOOK:

Carson, Rachel. The Sense of Wonder. Harper & Row, 1965. Adult--but very good to use with children. $7.95.

In a Vacant Lot



There are riches to be found in a vacant lot. Whether the lot is narrow, small, and shaded, large, bright and sunny, or something in between, it can be worth exploring if you know what to look for. A vacant lot is not really empty at all, but is full of fascinating things. It contains many plants and animals and all the things that they need to live: space, food, air, water, and sunlight. (NOTE: It would be wise to get permission from the owner of the lot if you want to dig in the earth or if there are more than a few people in your visiting group.)

Why not try at least several of the following activities--and you may find that you do not want to stop! Many of these activities may also be suitable for exploration of a yard, school site, forest preserve, or park. Digging, of course, should not be done on any public land. You may want to check your public or school library for books to help you identify what you find.

- Learn the history of the lot; what was there before? How was it used over the years? If there were buildings, why were they torn down? How many owners have there been? How did the first white owner get it from the Indians?

A WORD OF CAUTION

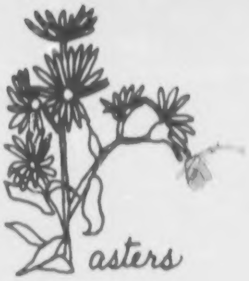
As with any well-planned field trip, a vacant lot should be checked out in advance. Many lots are dangerous. They may contain rusty metal and broken bottles as well as rats' (and mice) nests and dog feces that may carry disease.

Also, if you are considering trying to have a garden in a vacant lot, remember that frequently the base is rubble from a building.

Soil

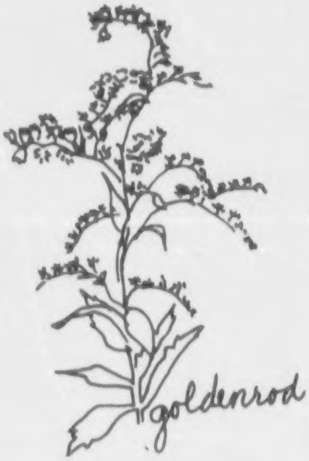
- Find a path that has been trampled by people. Why did people select this path? (Note the presence or absence of plants where the soil is packed down, and in low spots where the soil has not been compacted.)
- Look for signs of erosion. Has rain washed topsoil from high spots to lower ones? Are there gullies where running water carried soil down a slope? Do you see stones that stand on little mounds of soil which they have protected from the force of raindrops while the bare earth around them has washed away? Have any tree roots been exposed as soil washed away? On a breezy day, do you see dry, powdery soil that may be compared with dust storms? Sometimes a dust-devil will swirl across the lot.
- (After getting permission) dig a hole with a spade to determine the depth of the topsoil. Use a hand lens to see that it is composed of mineral particles mixed with bits of plant and animal remains. Compare the topsoil with the subsoil.

Can you see that the latter consists mostly of mineral particles? Find leaves and stems that are disintegrating to become part of the soil. Consider the importance of conserving topsoil. You may find fill placed over the original topsoil; you can interpret this.



Plants

- Notice the variety of common wild plants and that each kind (species) has certain characteristics which help identify it. It is not necessary to learn the names of plants, though it is wise to learn to recognize poison ivy as it looks in all seasons. And you may want to learn to recognize asters, chickory, goldenrods, ragweeds, thistles, docks, dandelions, plaintains, daisies, Queen Anne's lace, wild mustard, clover and wild strawberries.



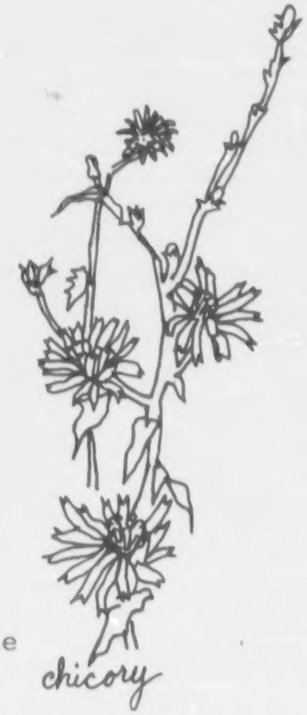
- In autumn make a display of seeds. Pick one of each of any seedheads that are plentiful. Note the hitchhikers (seeds that catch onto clothing) and those scattered by the wind, some with parachutes, as well as those that attract birds.

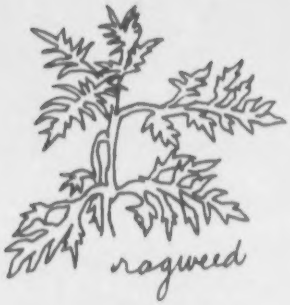
- If common milkweed is being examined, observe the flower shape and odor and that the milky juice is rubbery; it is latex and similar in make up to that which is tapped from rubber trees; look at the beautiful pods, either open or closed; notice how many winged seeds one pod contains; learn about the relationship of the milkweeds and the monarch butterfly. Some milkweeds are becoming quite rare.

- Examine the trees in the lot; is there evidence that any of them grew from the seeds of nearby trees? Look for other young trees and shrubs that may have grown from seeds that were dropped by birds or blown by the wind. Are any of the trees spreading by root runners, such as chokecherry? If this is a city lot, you may find the ailanthus, a tree which produces many seeds which are carried by the wind and germinate under a wide variety of conditions. You may also find the sycamore, the tree with the mottled bark.

- Feel the temperature of the air under the tree; is it different from the air temperature in the sunlight?

- If you are in the lot during a light rainfall in the summer or autumn, notice how the rain strikes leaves and rushes down stems of plants and into the

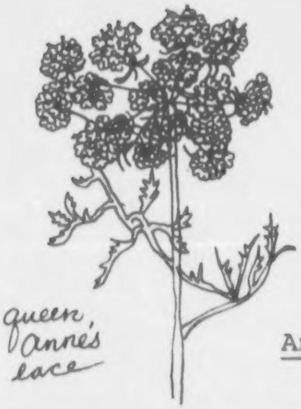




soil. See tiny streams and lakes form in the cracks and hollows of the soil.

- If you find a stump or a tree that has been cut down, can you count the rings in the wood (one to a year) to determine how many years the tree had been growing? If the tree is newly cut, which rings were formed in different important years in your life?

- Observe the roots of a tree that was blown down; note the mass of smaller roots that absorbed moisture and minerals from the soil and the larger roots which anchored the tree in the ground.



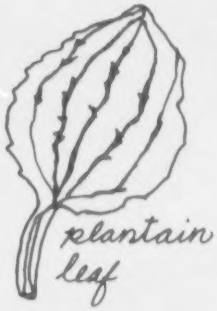
- Examine old logs or pieces of wood that are being decomposed by fungi and insects, thus freeing the materials for a return to the soil in what is an ever-repeating cycle of nature. Can you find woodpecker holes in the logs?

Animals

- Look for earthworm castings (fecal remnants), little piles (nodules) of earth left on the surface as the earthworm casted off digested soils while making its tunnels and eating. Earthworms are valuable to soil as they set up conditions for movement of decayed plant material down into the earth where it enriches the soil, and they open up tunnels which admit air and moisture to the soil.

- Look for signs of mammals: holes, burrows, food paths, droppings, feedings or trails. Learn more about the kinds of homes animals make.

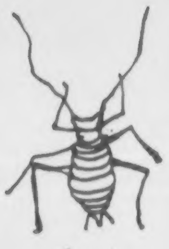
- Do you see any birds feeding, resting, nesting, bathing, drinking or singing? Can you see house sparrows, starlings, pigeons, or robins, the most common city birds? What do they eat? Where do they nest?



- Use an insect net to catch insects, put them in a wire cage or a jar with a perforated top, to observe for a short time, and then release them. You may find a surprising variety of insects in a few minutes if you brush (sweep) the tops of the grasses and weeds with a net.

- Turn over large stones or boards to observe animals living under them. You may find pill bugs, snails, slugs, centipedes, ants and others. Carefully replace the stone or board. Discuss how these animals adapted to living in such a dark, moist place.

- Look for insects on plants; small green plant lice (aphids) may be feeding on the juices of leaves or stems; a praying mantis may be eating the lice and other insects; lady bugs (ladybird beetles) may be devouring plant lice.

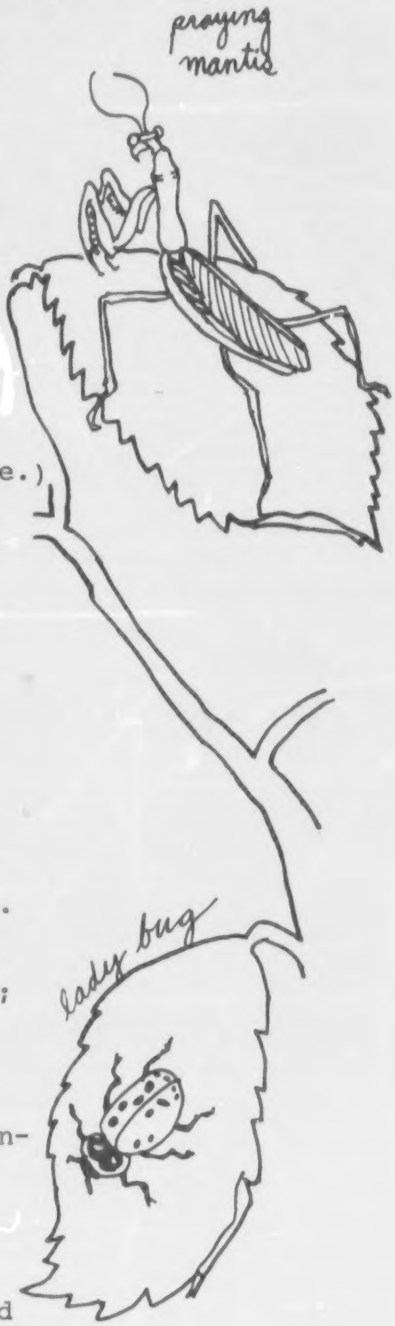


Plot Study (especially for teachers)

- Assign a small group of children to a designated square foot of the lot. Have them report the plants, animals and earth forms they find in this very limited area. Can they graph the information they find?

- Dig up (with the owner's permission) a six-inch cube , or less, of soil and put it in a bag. Let the children spread the soil on sheets of paper. Notice the decayed plant and mineral particles. Examine the plants and animals that are living in the soil. Can you tell what the animals were doing? Work out a definition of "humus". (Compare this project with the one on soil profile - you could do both at the same time.)

- Dig out a block of soil (again with the owner's permission). Take it back to the classroom and place it in an unused aquarium. Keep it moist but not wet. Lay a piece of glass over the top to prevent evaporation; if water condenses on the glass, allow a little air to enter by temporarily removing the glass or leaving an opening. Do not disturb this soil, but observe it daily for signs of animal and plant life. Can you return it to the lot?



Miscellaneous

- Examine any rocks that are breaking up into soil.

- Watch a certain plant or tree at intervals over a year; a milkweed plant would be a good choice; what else might you enjoy observing?

- Discuss the possibility of making a vest pocket or mini-park on the lot; children could plan what they might like in such a park:construction-type blocks; climbing ropes; railroad ties for balance beams, pipes for play - things other than conventional playground equipment. Get other individuals or groups to work with you. First of all, of course, contact the owner, perhaps going to city hall and checking the deed records to find out who it is. Have ideas ready to present to the owner. What might you do next?

wild
mustard

▶ After getting well acquainted with what lives in a vacant lot, you may want to visit the Morton Arboretum on Route 53 north of Lisle in DuPage County to see some of the plants, birds, and insects in their restored prairie. Compare the living things in the two environments - your lot and the Arboretum prairie: of course, at the Arboretum you will just look at things by staying on the paths and do no digging or collecting.

BOOKS TO ENJOY:

Blough, Glenn; Discovering Insects. McGraw-Hill, 1967. intermediate grades. $4
Busch, Phyllis; City Lots: Living Things in Vacant Spots. World Publishing Co., 1970
Gannon, Robert; What's Under a Rock. Dutton, 1971. intermediate - adult. about $4

Also see books listed in the sections "Living Things Around Us" and "Open Spaces/Green Areas".

Under the City

Think what is needed to support human life and to make people comfortable. Many of the supporting services for these necessities and comforts may be hidden--gas lines, electric wires, cold and hot water pipes, sewer pipes, telephone lines. In most cities and towns you walk by dozens of manholes every day and unless a cover blows off you scarcely notice them. Have you looked down manholes and wondered what is there? Or watched as sidewalks are chipped away so that workmen can dig a trench to lay electric cables, gas mains, or telephone lines, doing the work with as little inconvenience as possible to the rest of us?

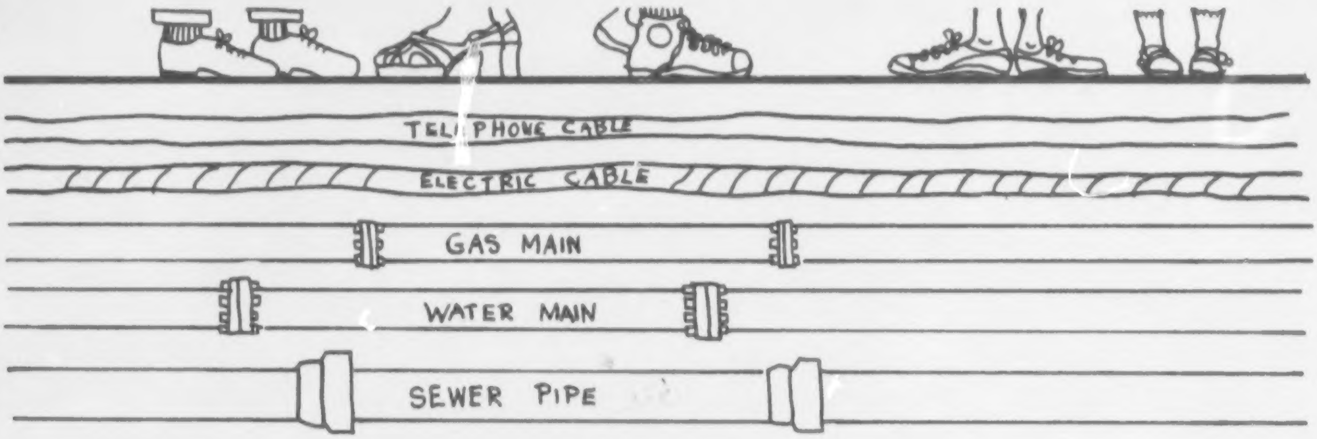
In the big cities there is a vast network that is under the pavement--miles of transportation lines, water mains, underground gas lines, sewers, telephone and TV cables, electric cables and even heat tunnels. In some places the tunnels are so crowded that it is difficult, if not impossible, to find spaces for additional pipes or wires.

Stop and look if you see any workmen in a manhole. Sometimes a special "tent" is placed over an open manhole and air is pumped into the "underground" where the men are working.

Water mains and smaller connections have to be deep enough--four feet in our northern climate--so that they will not freeze in the winter. Gas pipes must be located away from high voltage wires to cut down chances of an explosion even if there should be a leak. Shut-offs are mapped.

Where are the sewer lines which carry the community's waste water to the waste water treatment plant? They may be ten to twelve feet from the surface.

Do you know about the easements granted utilities to maintain their services? In the cities the easements may be in the alleys. Elsewhere they are in areas that people maintain as part of their yards. Water hydrants are made more visible by special color paints.



Think how carefully the workmen have to be so that they do not make a wrong move which might cut off telephone or electric service or cause a gas leak. How much we take for granted! Improvements are constantly being made in encasement materials for the vast underground system, but war explosives or severe earthquakes can be most disruptive.

BOOKS TO ENJOY:

Have you noticed that more gas and telephone lines are being put under ground?

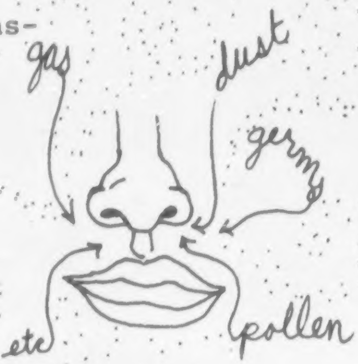
Lavine, David; Under the City. Doubleday, 1967. Intermediate grades - adult. $2.50.
Schneider, Herman and Nina; Let's Look Under the City. William R. Scott, Inc., 1954. Grades 1-5. $4.

Over the City (Air)

Most of us give little thought to the precious resource, air. We may realize that the layer of air around the earth is vital to us, that we need the oxygen in it to live. We may also know that it is composed of 78% nitrogen, 21% oxygen, and the other 1% hydrogen, carbon dioxide, and other gases. We may not be aware that this thick layer of usable air around the earth is only five miles wide. Beyond that the air gets thinner and thinner until airless space begins. THE AIR WE HAVE NOW IS ALL THERE IS. WE CANNOT MAKE OR GET ANY MORE.

Do you know that--air is dynamic, and given time, the atmosphere can cleanse itself of pollutants--by precipitation (rain, snow, etc.), oxidation, and absorption into the oceans? When pollutants concentrate faster than they are dispersed and/or the atmosphere can cleanse itself, people breathe in pollutants.

On the global scale the total amount of naturally-occurring particles and gases in the air is great in comparison to that which people cause. However, the problem with air pollution due to people is its concentration in a relatively small geographic area. Generally, the concentration of pollution is, as one would expect, most severe where the most people are. This is why so much attention has been directed toward air pollution. Many categories of natural emissions can be considered uncontrollable. On the other hand, many categories of people-made emissions are controllable. Consider the auto, for instance. Where vehicular traffic is heaviest--in downtown areas of cities, tunnels, underground parking lots--the air pollution is the greatest. Limiting auto traffic in centers of cities and extending mass transportation systems are ways to try to control the problem.



Few of us think about what we are taking into our lungs along with the life-sustaining oxygen--the gases, tiny dust particles, germs, pollen from plants, spores, water vapor. At times we might be aware of ozone, a common gas in city air that hurts people's throats and lungs and makes them cough, but we might not know about or might forget about microscopic particles that can cause respiratory difficulties or invisible gases such as carbon monoxide from the exhaust of buses, trucks, and cars, which can cause dizziness and headaches. These pollutants are man-made wastes.

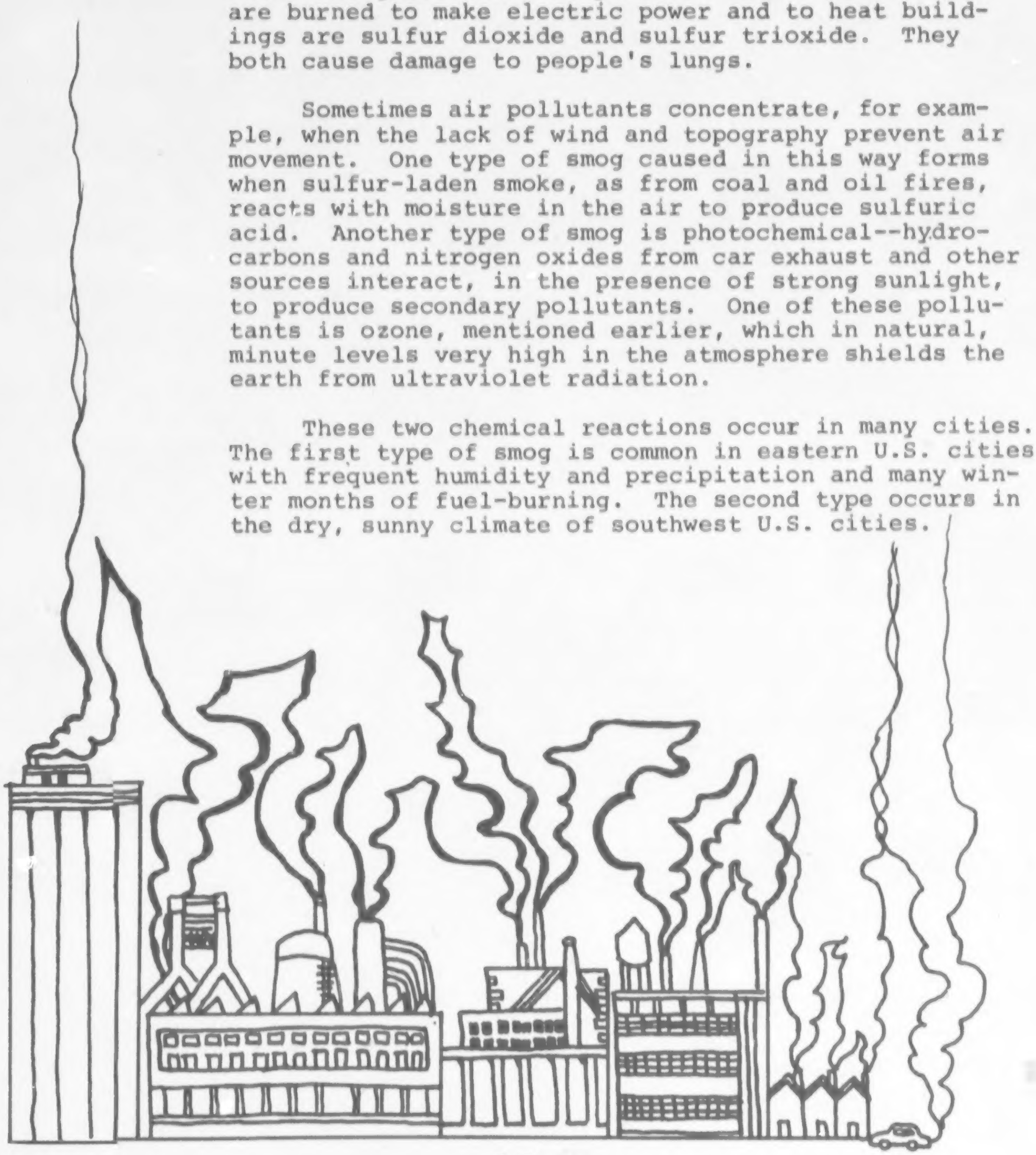
Long ago humans added little to the air, perhaps smoke from campfires or from the fires set in grasslands or forests. It was different when factories and motor vehicles which burn wood or coal and other fuel became numerous. At this point man-made pollution increased considerably.

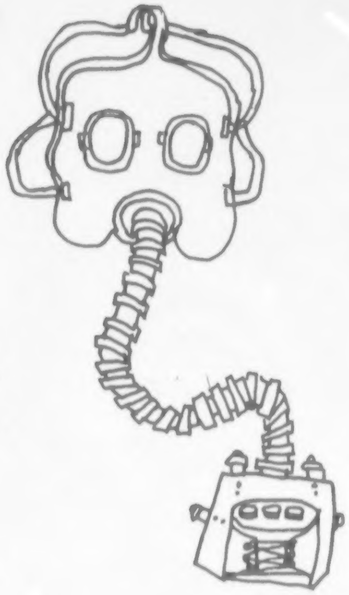
While air pollution is caused naturally by decaying vegetation, forest fires, and erupting volcanoes, these contribute only a small amount to the total pollution.

Today there are few, if any, smoky chimneys, but there are other problems, especially those caused by colorless invisible gases and by particulates in the air. Two gases that are produced when coal and oil are burned to make electric power and to heat buildings are sulfur dioxide and sulfur trioxide. They both cause damage to people's lungs.

Sometimes air pollutants concentrate, for example, when the lack of wind and topography prevent air movement. One type of smog caused in this way forms when sulfur-laden smoke, as from coal and oil fires, reacts with moisture in the air to produce sulfuric acid. Another type of smog is photochemical--hydrocarbons and nitrogen oxides from car exhaust and other sources interact, in the presence of strong sunlight, to produce secondary pollutants. One of these pollutants is ozone, mentioned earlier, which in natural, minute levels very high in the atmosphere shields the earth from ultraviolet radiation.

These two chemical reactions occur in many cities. The first type of smog is common in eastern U.S. cities with frequent humidity and precipitation and many winter months of fuel-burning. The second type occurs in the dry, sunny climate of southwest U.S. cities.





People also breathe in many tiny particles. Most are not harmful but some cause lung disease, such as bits of asbestos from the brake linings of cars and trucks. Tiny particles of lead, which come from auto exhaust, can damage the nervous system and lungs.

There is a host of other environmental airborne contaminants which affect living and non-living systems; and some of the manufactured chemical compounds and their wastes pollute air and water and soils, as well as speed up deterioration of metals used in cars and other goods, pit concrete and marble used in roads or buildings, and slow down or destroy life functions of green plants; or change the genetic codes of living systems. (For an up-to-date discussion of a large number of air and water contaminants, the more serious readers are referred to: Chemical Villains: A Biology of Pollution by James W. Berry, David W. Osgood, and Philip A. St. John (Mosby, 1974) or Sourcebook on the Environment by Charles and Penelope Revelle (Houghton Mifflin, 1974).

When air pollution occurs, people with lung ailments are hurt first, but others may also be affected. There is an annual increase in incidence of respiratory diseases such as bronchial asthma and emphysema, and doctors do not really know how many headaches and sore throats are caused by various pollutants, separately or in interaction.

Increasingly cigarette smoking is being prohibited in public places. What other indoor pollution can you think of?

If air pollution can seriously affect the health of people, what effects must it have on other animals and on plants? Its immediate effect on plants concerns people as they use plants for food, but there is also the concern that a world with fewer plants is not as beautiful a world to live in.

What other effects does air pollution have?
It causes paint to peel off houses and automobiles.
It causes metal on cars, buildings, and bridges to disintegrate.
It corrodes stone in statues and buildings.
It causes clothing and buildings to need more frequent cleaning.

What can be done? In the short run, for example, a car owner can:

- try to cut down use of his car by planning errands and trips more efficiently
- keep his car in good shape
- try to arrange a car pool, if not in one already

- take public transportation to work or school or shopping, if at all possible
- operate the car properly--avoiding quick starts and stops, not letting the motor idle for long periods
- buy a low-powered car which uses less gasoline and causes less air pollution.

Congress is considering taxing motor vehicles which use too much gas. Find out if this law was passed and whether the taxing approach is effective.

In the long run, with cars, trucks and buses producing more of the air pollution in cities than other sources put together, a long, hard look must be taken at the internal-combustion engine. New cars are required to have a device that adds more air to unburned wastes and burns them more completely. Many older cars on the road do not have such devices. Some people are annoyed because the devices seem to cut down on gas mileage and may not have been effective enough. Can the internal combustion engine be improved sufficiently to provide an acceptable pollution level, or should research on alternatives to this engine be vigorously pursued?

Can you find out about the Federal controversy about using motor vehicle tax funds for highways vs. mass transit systems?

Improved mass transportation seems highly desirable, if not essential. We need to upgrade rail and bus systems and develop new facilities; we should give serious thought to the fact that one of the first comments made by many Americans who visit Europe is often about their efficient, attractive, reliable public transportation.

Discouraging auto traffic in the center of cities is a policy of some cities: with bans on parking in many areas, increased fees for day-long parking, and closing of streets to traffic to create malls. Traffic can be speeded up in cities by creating more one-way streets, banning stopping and parking, setting aside express lanes for commuter buses. Fleets of trucks, buses and government cars can be converted to less-polluting fuel systems; this is already being done in some cases.

Factories can cut down harmful emissions so that they no longer pollute the air by making changes in processes, fuel substitutions, and using exhaust-control devices.

Some urban-based companies collect, process, and sell substances that formerly were discharged to the atmosphere, thereby reducing pollution.

The individual citizen may want to join citizen groups which prod the government into action. Such participation has resulted in tougher air standards than were originally proposed and in pressure for adequate funds and staff for air pollution control agencies. Such citizen groups are especially important now when there have been, and probably will continue to be, strong attempts to weaken the Clean Air Act. These groups will also notice the amount of money spent on such campaigns compared to the amount of money actually spent on environmental research or on pollution control.

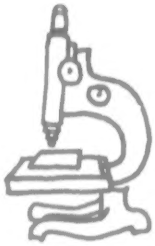
The individual citizen can always write to area representatives at all government levels about environmental problems, especially if he or she is willing to pay a higher price for goods or higher taxes to improve or preserve environmental quality.

The individual can also thoughtfully re-evaluate use of electricity--deciding whether to get along with fewer appliances and to cut back on use.

Trying to preserve quality air is a complex problem. The stakes are high, public health is precious. We must ask ourselves searching questions, if we wish to have air safe enough to breathe:

- Are we ready to change our life styles and values?
- Are we willing to pay higher prices for cars with emission controls or cars other than those with internal combustion engines?
- Are we willing to pay more for electricity that is less polluting to produce?
- Will we restrict our driving, accept bans on cars in city centers, and demand improved mass transportation?

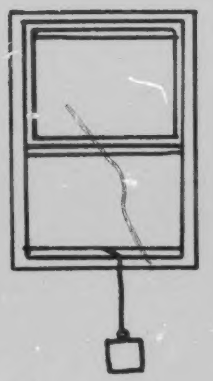
> "Air pollution destroys health, degrades the environment, represents the loss of natural resources. There are ways to control air pollution; there are prices to pay, in terms of dollars and convenience, in order to reduce pollution. What quality of air do you want? What personal practices, public policies, and expenditures will you support in order to obtain that air quality?"
>
> from Conclusion of "A Congregation of Vapors", League of Women Voters Facts and Issues. September, 1970.



THINGS TO DO:

▶ Talk to a garage mechanic about what can be done to keep cars in shape so they are less polluting.

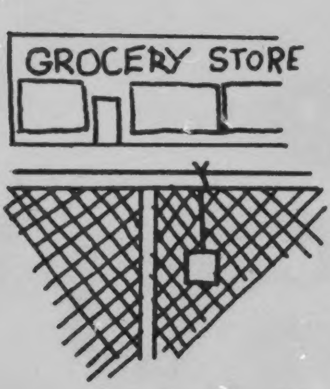
- Ask about advantages and disadvantages of pollution-control devices.
- If you have not ridden a train for a long time, take a train ride; compare this form of transportation to the use of the auto.
- Make a list of things that are powered by gasoline engines; could you or your family do without those you own, or cut down your use?
- Compare the air pollution caused by various means of transportation in relation to the number of passengers carried: auto, airplane, bus, train, other.
- Make a list of the ways air pollution affects your life or the lives of people you know.
- Learn how polluted air affects other animals.
- Learn how dirty air affects plants.
- Look at houses or other buildings for damage caused by air pollutants.



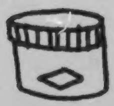
- Select a place in your yard, near your home, on the school ground, etc. where you can be away from large objects; consider the following:
    - is the air moving?
    - from what direction is it coming?
    - is the air carrying an odor? If so, describe the odor.
    - Does the air have a taste? (inhale it deeply)
- Use a Ringelmann Smoke Chart to figure amount of pollution in smoky air (obtain chart from Chicago Lung Association--see information at the end of this chapter).
- Trap air pollutants:

    Get a small tin can or glass that will fit into a larger fruit juice can or glass. Spread white petroleum jelly on the outside of the small can or glass. Set it outside for a few days. The jelly picks up the dirt in the air. The big jar protects the smaller jar from dirt blowing from the ground.

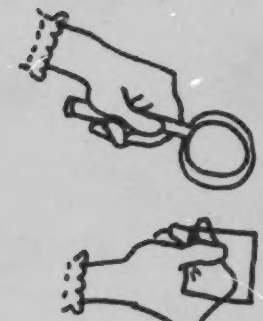
    Do the same thing, but use a piece of white cloth smeared with petroleum jelly; suspend it in a jar.



- Examine the can or cloth with a magnifying glass. What do you see: Are the particles natural, man-made, or mixed?
- Find out how much pollution there is in different areas in your community. Take glass slides. Mark the location of each slide on masking tape before smearing with jelly. Coat one side with white petroleum jelly. Place a slide in such locations as school or home rooftop, a window ledge, in a shopping or commercial area. Hang slides from a rope or string or place it on a flat surface. Expose all the slides about the same length of



time, and if possible, for the same time (1 day, 2 days, a week). After collecting the slides, place them on white paper, coated side up. Examine them under a microscope or under a strong light with a magnifying glass. Compare them with slides that were kept indoors in a closed container. Compare kind and amount of particles. Record what you see. What area had the cleanest slide? the dirtiest? Are the particles natural, man-made, or mixed?



- Learn whether your community has an environmental commission; if so, attend a meeting; learn what problems they handle and what powers they have.

BOOKS TO ENJOY:

Aylesworth, Thomas G.; This Vital Air; This Vital Water: Man's Environmental Crisis. Rand McNally, 1968. Grades 6-up.
Bloome, Enid; Air We Breathe. Doubleday, 1971. Primary. $4.
Chester, M.; Let's Go to Stop Air Pollution. Putnam, 1968. Intermediate-adult. $3.
Elliott, S.M.; Our Dirty Air. Messner, 1971. Intermediate. $4.
Kavaler, L.; Dangerous Air. Day, 1967. High Intermediate. $4.
Shuttlesworth, Dorothy; Clean Air-Sparkling Water. Doubleday, 1968. Intermediate-adult.

CURRICULUM MATERIALS:

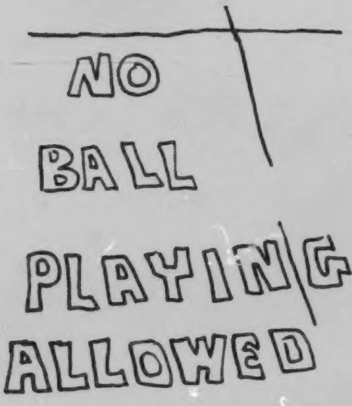
The Chicago Lung Association (formerly Tuberculosis Institute of Chicago and Cook County), 1440 W. Washington Blvd., Chicago 60607; write for list of free materials, which include Ringelmann Smoke Chart.
The League of Women Voters, Citizens Information Service, 67 E. Madison, Chicago 60603--write for catalog of publications.
U.S. Environmental Protection Agency, Public Affairs Office, 230 S. Dearborn, Chicago 60604 --write for list of publications on air.
U.S. Department of the Interior, Bureau of Land Management. All Around You: An Environmental Study Guide. 1971. Available from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. For intermediate and junior high, but adaptable to other grade levels. Stock No. 2411-0035. $1.50.

Have you noticed another kind of pollution--visual pollution--caused by signs and such things as high power transmission lines crossing rural landscapes as well as urban areas? How can we preserve our natural vistas? Has your community passed sign regulations?

School Sites - Use and Development

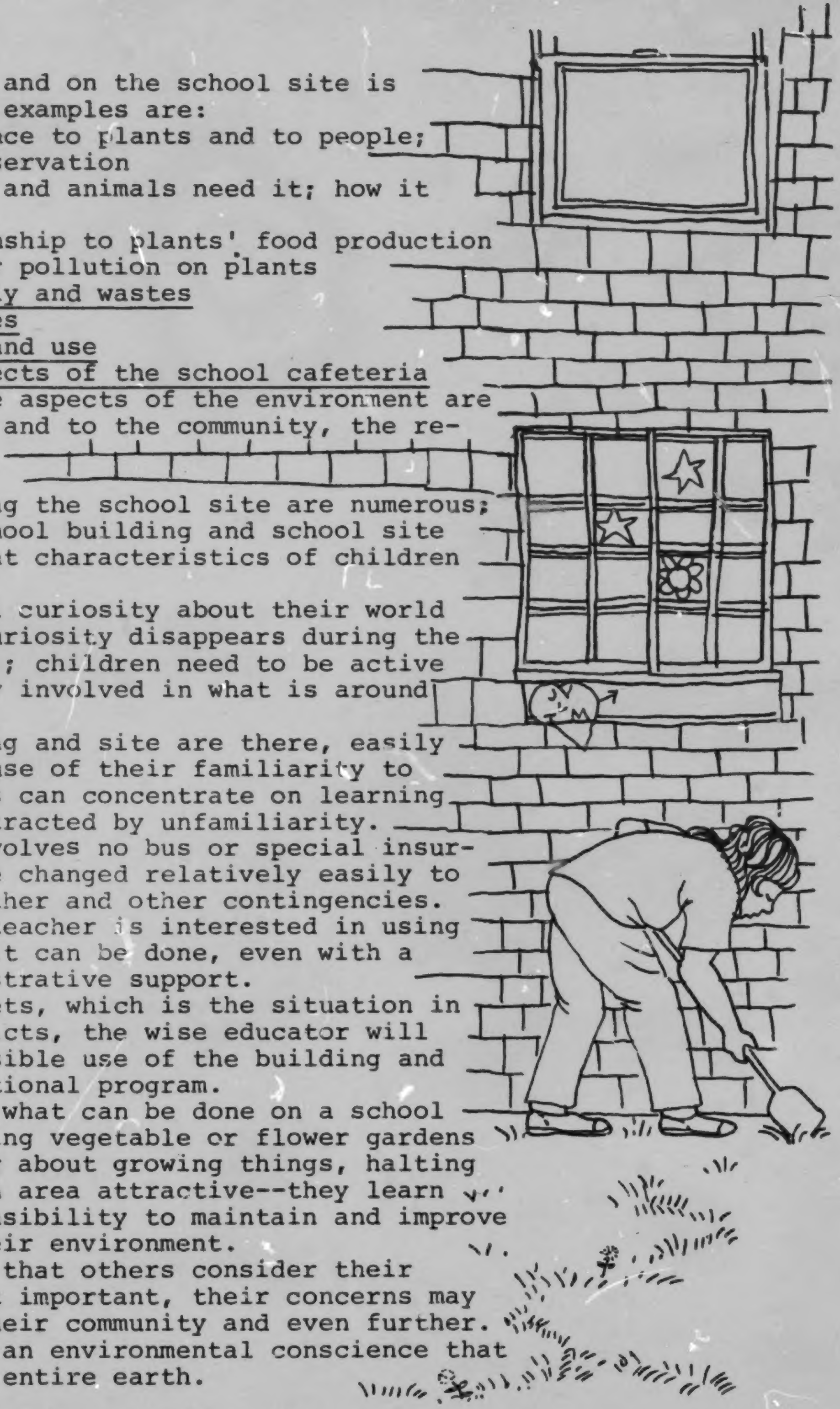
NOTE: This topic is by its very nature oriented to teachers and administrators. Parents, youth group leaders and other individuals may well want to read it and perhaps investigate what their local school or school district is doing in environmental education. If there is a good program, you may want to commend the school. If little is done, here is an opportunity and a challenge to you to act.

Wherever a school is located, it is, of course, a kind of environment, and what has been done to make the school site good for environmental learning reveals much about the environmental attitudes of the teachers, administrators, and community.



How can the school building and its site be used for more learning? Look closely at them. Describe them to yourself. In our six counties, schools vary from those in urban areas with several stories and perhaps a monotonous paved playground area,to spacious suburban one-storied buildings with great variety on the site, well developed for environmental learning--with many gradations and variations in between. No matter what kind of site you have, however, it can be developed for environmental learning. The approach used in this Sampler of looking closely at various aspects of the environment around you, is admirably suited to using school sites. While it may be exciting to have a site with creek, swamps, or woods, most school sites do not have these natural advantages. Therefore, it is important to consider what can be done on a school site. If it needs development, it will be a real challenge. Development will offer many advantages aside from a richer learning area--not the least of which will be learning more about community resources and further developing social skills of cooperation, problem-solving, and decision making. It will, of course, take planning, resourcefulness, dedication, and hard work. "But the results", so say those who have done it, "are well worth the effort".

You may say, however, "Why be concerned with using or developing a school site? There is enough to do in the classrooms." But, as many teachers recognize, first-hand experiences are exciting, and most of all, relevant. Many things are best learned in an outdoor environment. The list of what can be learned



in the school building and on the school site is almost endless. A few examples are:

- soil--its importance to plants and to people; need for soil conservation
- water--how plants and animals need it; how it erodes soil
- sunlight--relationship to plants' food production
- air--effect of air pollution on plants
- school water supply and wastes
- school solid wastes
- power generation and use
- environmental aspects of the school cafeteria

You can learn how these aspects of the environment are related to one another and to the community, the region, and the world.

Advantages of using the school site are numerous; plans for using the school building and school site can take these important characteristics of children into account:

- Children's natural curiosity about their world (too often this curiosity disappears during the educative process); children need to be active and to be actively involved in what is around them.
- The school building and site are there, easily reached, and because of their familiarity to students, students can concentrate on learning without being distracted by unfamiliarity.
- Using the site involves no bus or special insurance; plans can be changed relatively easily to adjust to the weather and other contingencies.
- Even if only one teacher is interested in using the school site, it can be done, even with a minimum of administrative support.
- With limited budgets, which is the situation in most school districts, the wise educator will make the best possible use of the building and site in the educational program.
- When students see what can be done on a school site, i.e., planting vegetable or flower gardens or trees, learning about growing things, halting erosion, making an area attractive--they learn about their responsibility to maintain and improve the quality of their environment.
- When students see that others consider their school environment important, their concerns may well broaden to their community and even further. Thus they develop an environmental conscience that can encompass the entire earth.

Invaluable to teachers and administrators interested in using or developing a school site is a book published in 1973 by the Illinois Institute for Environmental Quality. The exciting publication is: Envimental Education and Your School Site by Donn Paul Werling (1973). This book was sent to the superintendents of every elementary and unit district in the state, as well as to the superintendents of the Educational Service Regions. If you have not yet seen or heard about this book, check with your school administration about it. Also see Bibliography.

Werling, in the Rationale for his book, states:

> "In less than half a century our nation has changed from a predominantly rural to a predominantly urban society. At the same time, our technology and affluence have made us more comfortable at tremendous cost to the environment, upon which all life depends. If we are to respond to these conditions, we must cultivate a new set of attitudes towards our earth and its resources."

Environmental education works toward this new set of attitudes and using the school site helps provide a sound environmental education program.

One way to begin to make use of a school site is with an inventory of what is there. Of help is Appendix D of Werling's book, a 3-page "School Site Analysis Form Sheet". Werling also discusses the important environmental techniques of developing environmental sensitivity, using teaching stations, and planning environmental encounters.

He defines a "process approach" to the development of a school site for use in environmental education, i.e., an approach which involves the student body, school personnel, and community in the planning, development, and use of the school site as a "green island" for school and community use.

Parents and others in the community who might be concerned that "basic" subjects could be overlooked when there is emphasis on using the school site, can easily be reassured that reading, math, and writing improve with a good environmental education program. In addition children learn to :

- think more clearly about their immediate world
- develop skills of speaking, writing, recording, measuring, in ways that often are more relevant than classroom activities
- develop problem-solving and decision-making skills
- increase the creative aspects of their lives.

Through their interaction with their school site, students become knowledgeable about environment, motivated to work on environmental problems, and skillful about dealing with problems. With citizens called upon to make more and more environmental and consumer decisions, experiences which students have through good environmental education programs will help them become more thoughtful, better informed, and action oriented citizens.

Several other points worth considering are:

- ▶Involving the students and the community in the planning and development of the site helps cut down vandalism--an increasing concern to many school districts.

- ▶Involving the community leads to their pride in the school site: Werling points out on page 1 in his book "A citizenry which feels a sense of ownership and stewardship of its public land (and among the most visible public land are our school sites) is a long way down the road toward a spaceship earth perspective in which everyone feels a part of, and thus a responsibility for, the total environment".

- ▶The school site developed by and with the community, and used by the community, increases surrounding property values.

Werling stresses (page 7) the importance of youth and adults being participants in the solution of environmental problems:

> "Education's initial reflex response to the environmental crisis was to have students listen to speeches, watch movies focusing on clouds of billowing smoke, and make posters which berated pollution..." (Although these activities may have) "a definite place in environmental education, psychologists have stated that if people's anxiety level is raised, but action is delayed, the less likely it is that these people will ever act. What is needed, therefore, is a vehicle which can enable youths and adults to actively participate in solving environmental problems. A school site development project can be such a vehicle for action. It can open the door to problem-solving activities on the school site and in the community that will foster the building of confidence and problem-solving skills which our society so critically needs."

For information on good examples of school sites used for environmental education, write or phone:

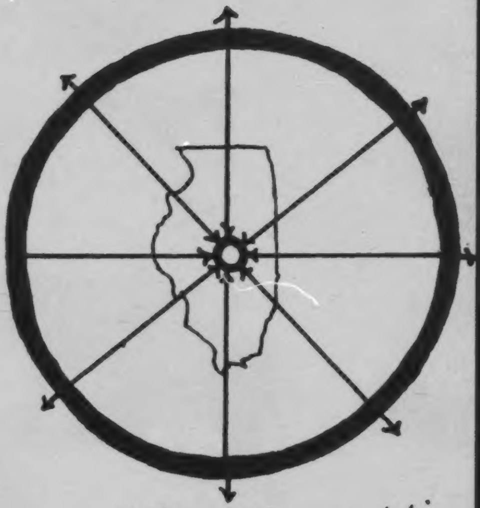
- Donn Werling, Director, Evanston Environmental Association, Ecology Center, 2024 McCormick Boulevard, Evanston 60201 (312) 869-8030.
- Lance Bedwell, Environmental Education Specialist, Illinois Office of Education, Springfield 62706 (217) 782-5235.
- Your Education Service Region (see phone book or ask Directory Assistance)
- The area office of the Soil Conservation Service, U.S. Department of Agriculture, which began to offer help in school site development for environmental education several years ago.

FARTHER FROM HOME

Transportation

A chapter on Transportation appears in this book on environmental study areas for several reasons:

- to help readers understand what has gone before so they can better evaluate various transportation environmental study areas and more wisely plan for the future;
- to help readers look at the environmental effects of various modes of transportation;
- to help look at the energy efficiency of the various transportation modes, ways to conserve energy, and innovations.



Illinois, transportation hub

Illinois and Chicago have been called "the transportation hub of the world". Quite possibly, more people and freight pass above, across, and along the air routes, waterways, roads, and railroads of Illinois than anywhere else in the world.

Illinois history has been intimately bound up with transportation of goods and people. For centuries rivers were important to the Indians, the French explorers, and the early settlers. Until the early 1800's, travel was by foot and by horse, when not by water. Later, when settlers both produced more food than they needed for survival and moved farther from navigable streams, there was a need for a relatively cheap and convenient means of moving bulk agricultural products to towns and on to distant markets. In addition, the settlers wanted staples and manufactured goods whose cost depended greatly upon transportation costs. Thus, the railraods became important.

The Indians followed animal paths and made new trails of their own, almost always the easiest routes over rough ground. Early roads followed the Indian trails.

When it became obvious in the 1850's that overland transportation routes would come to and through Illinois, there was a rush to build railroads around the state. The coming of the railroads caused a decline in use of the waterways. The railroads helped immeasurably to make Illinois prosperous.

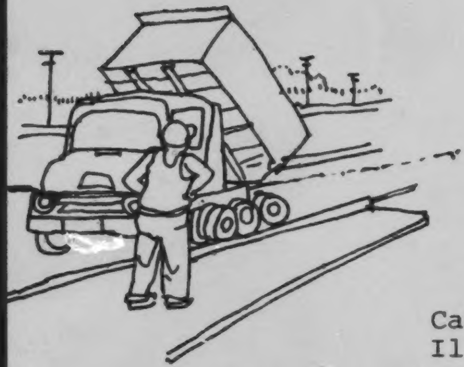
Recognizing the crucial importance of transportation to the expanding economy and to society, the Federal government gave aid to canal-building in the early 1800's and later to railroads, to roads, and more recently to air transportation.

Roads--The first federally-funded highway in the United States was the National Road, begun in Maryland in 1811. It reached Cumberland, Ohio, in 1833, and Vandalia, Illinois, in 1839. Well-built with macadam pavement, it diverted considerable traffic from the Ohio River, bringing settlers and goods to Illinois and providing a way for stockmen to drive cattle and hogs to Eastern markets.

In Vandalia a "Madonna of the Train" statue, one of twelve along the National Road, indicates the end of this famous and important road.

Decades later--in 1916--Federal legislation resulted in massive aid moving away from railroads and to highways. Later, as motor travel became increasingly important, there was a boom in road building. When the highway and road system became extensive, development occurred along the major routes, taking over from the historical settlement along the railroads. With the extensive road system in Illinois and other states has come increased truck transportation. Chicago's importance in truck freight is shown by the following facts:

- Chicago's truck tonnage exceeds that of any other area by 10 million tons
- the number of people employed in the Chicago area trucking industry is the highest of the metropolitan areas in the U.S.
- 2,000 trucking firms operate 12,000 vehicles that make overnight deliveries to 2,000 communities within 400 miles of Chicago
- more than 54,000 communities are served by trucks from Chicago.



Waterways--In 1848 the Illinois-Michigan (I-M) Canal was opened, linking Lake Michigan with the Illinois and Mississippi Rivers, making the northern part of Illinois more accessible to early settlers. It continued in commercial use until 1914, and parts of the Canal are still in recreational use. In 1900, the function of the I-M Canal was taken over by the Sanitary and Ship Canal, built from Chicago to Lockport chiefly to reverse the flow of the Chicago River which carries away Chicago's treated sewage and also provides water transportation.

Until the Panama Canal was built, the Sanitary and Ship Canal was the longest canal in the world.

Beginning in 1872, the lower Illinois River was canalized, with locks and dams built at various points. The present-day Illinois Waterway extends from Lake Michigan in Chicago to the point where the

Illinois River empties into the Mississippi River, 327 miles away. Thus, the Waterway--made up of the Chicago River, the Sanitary and Ship Canal, the DesPlaines River, and the Illinois River--connects the Great Lakes with the Mississippi River, the Gulf of Mexico, and the rest of the world!

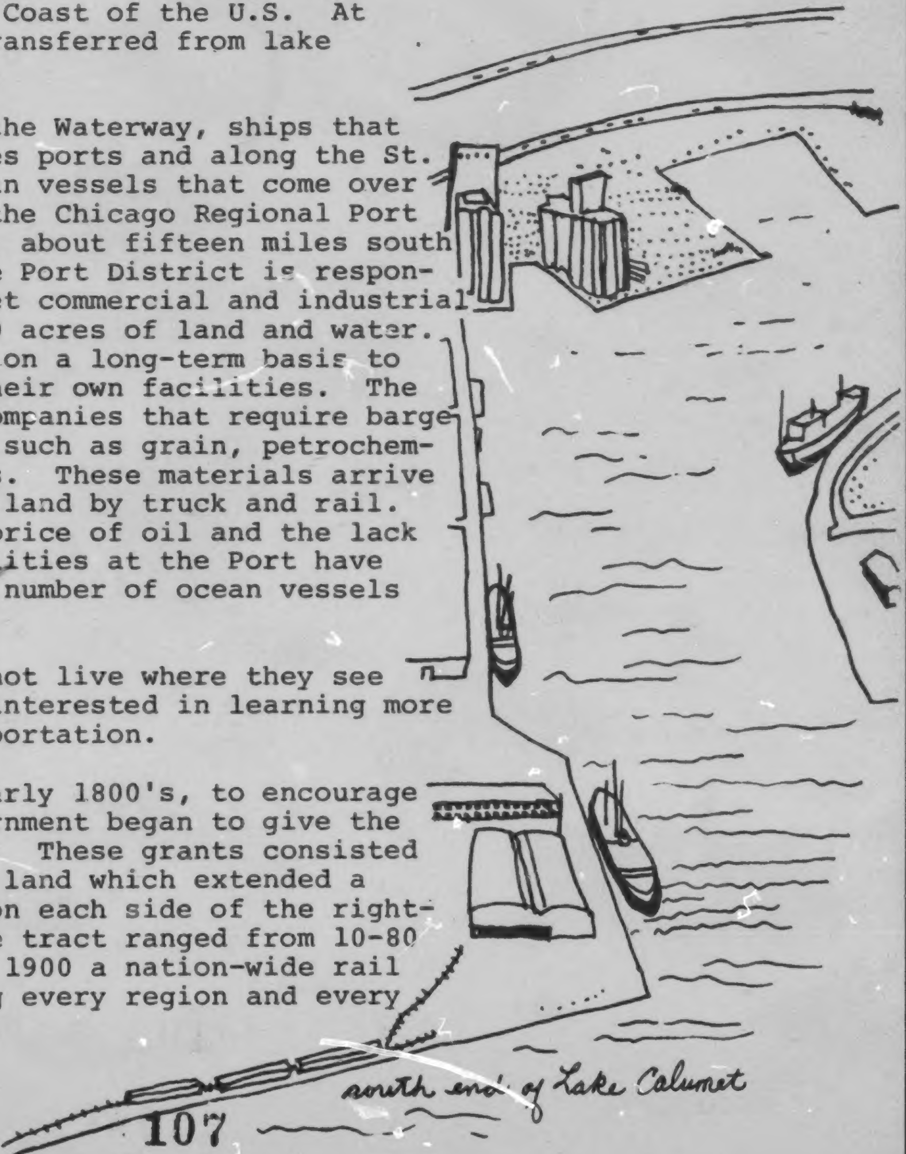
There is considerable barge traffic on the Illinois Waterway, as well as on both the Mississippi, bordering Illinois on the west, and the Ohio River, which forms Illinois' southeast boundary. Barging is the least expensive form of shipping and can be done when speed is not important. Barges carry coal, sand, grain. iron and steel, chemicals, petroleum products, and other raw materials. Some cargo is sent from Chicago over the Waterway, down the Mississippi, across the Gulf, through the Panama Canal to the West Coast of the U.S. At Chicago some goods are transferred from lake freighters to the barges.

Tow boats can handle a maximum of 8 barges on the Waterway and 25 barges on the Mississippi River.

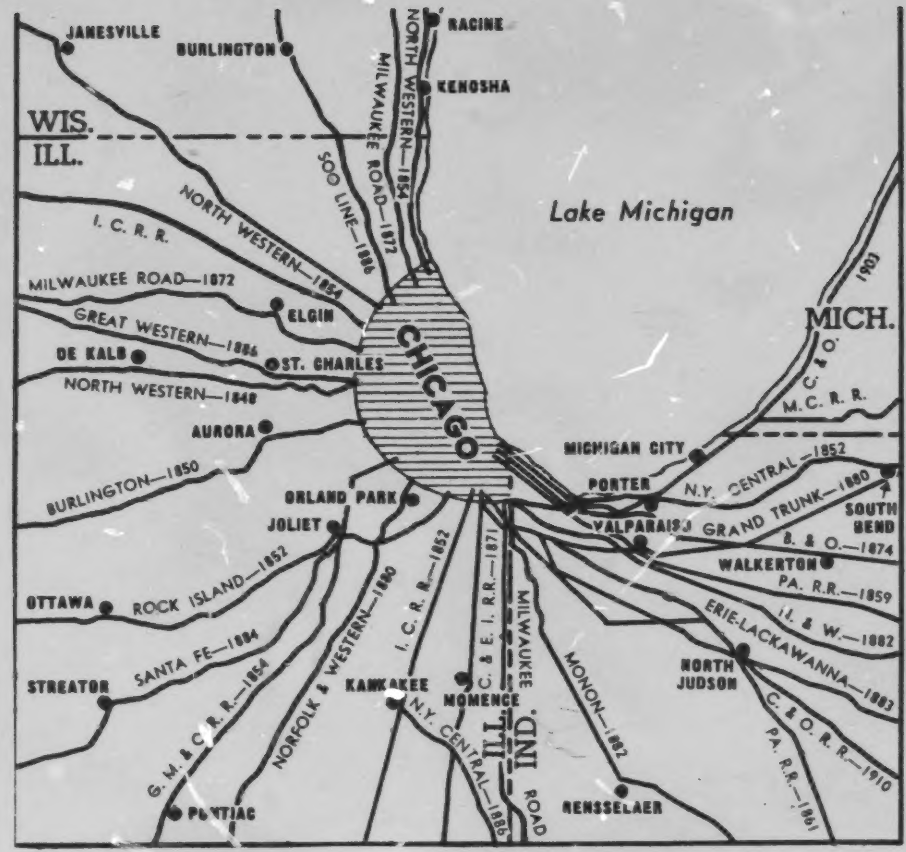
Barges that travel the Waterway, ships that travel between Great Lakes ports and along the St. Lawrence Seaway, and ocean vessels that come over the Seaway, all come to the Chicago Regional Port District at Lake Calumet, about fifteen miles south of downtown Chicago. The Port District is responsible for the Lake Calumet commercial and industrial harbor which covers 2,200 acres of land and water. The District leases land on a long-term basis to companies that develop their own facilities. The area is well-suited to companies that require barge and ship transportation, such as grain, petrochemical, and steel companies. These materials arrive at and leave the Port on land by truck and rail. Recently, the increased price of oil and the lack of containerization facilities at the Port have caused a decrease in the number of ocean vessels that come to this Port.

Many people who do not live where they see barges regularly may be interested in learning more about this form of transportation.

Railroads--In the early 1800's, to encourage railroads, the U.S. Government began to give the companies grants of land. These grants consisted of alternate sections of land which extended a certain number of miles on each side of the right-of-way. The width of the tract ranged from 10-80 miles! Between 1865 and 1900 a nation-wide rail system was built, linking every region and every major city.



south end of Lake Calumet


JANESVILLE
BURLINGTON
RACINE
KENOSHA
NORTH WESTERN—1854
MILWAUKEE ROAD—1872
SOO LINE—1886
WIS.
ILL.
Lake Michigan
NORTH WESTERN—1854
I. C. R. R.
MILWAUKEE ROAD—1872
ELGIN
GREAT WESTERN—1886
DE KALB
ST. CHARLES
NORTH WESTERN—1848
AURORA
BURLINGTON—1850
CHICAGO
MICH.
C. & O.
1903
M. C. R. R.
MICHIGAN CITY
PORTER
N.Y. CENTRAL—1852
GRAND TRUNK—1880
SOUTH BEND
VALPARAISO
B. & O.—1874
WALKERTON
PA. R.R.—1859
N. & W.—1882
ERIE-LACKAWANNA—1883
NORTH JUDSON
C. & O. R. R.—1910
PA. R.R.—1861
ORLAND PARK
JOLIET
ROCK ISLAND—1852
OTTAWA
SANTA FE—1884
STREATOR
G. M. & O. R. R.—1854
NORFOLK & WESTERN—1880
I. C. R. R.—1852
C. & E. I. R.R.—1871
MILWAUKEE ROAD
MONON—1882
KANKAKEE
MOMENCE
N.Y. CENTRAL—1886
ILL.
IND.
PONTIAC
RENSSELAER

Reprinted by courtesy of the
Chicago Tribune from Chicago:
a Profile of Greatness
by David Halvorsen

In 1895, 38 railroads entered the City of Chicago with about 2,600 miles of track within city limits.

Railroad-building began in Illinois when canal traffic was at its height. The first railroad in Illinois was the Illinois Central, opened in 1856. In the years following the Civil War, Illinois was a key state in railroad construction and operation. By the early 1890's, Illinois led all other states in miles of railroad construction and miles of railroad in operation, with over 10,000 miles of railroad. This extensive rail network brought railroads within 20 miles of every point in the state.

Although Federal legislation was passed in 1916 that shifted the massive aid from railroads to highways, the former continued to flourish for some years. They have had a tremendous effect on life in Illinois, as they linked farm and city, bringing raw materials and markets together. Towns along the railroads sprang out of the prairies; communities away from the railroads faded away.

Many advances in railroading came from Chicago:

- the first cooled freight cars
- the Pullman cars
- the Mather car, a humane railroad car for livestock
- automated freight car sorting yards.

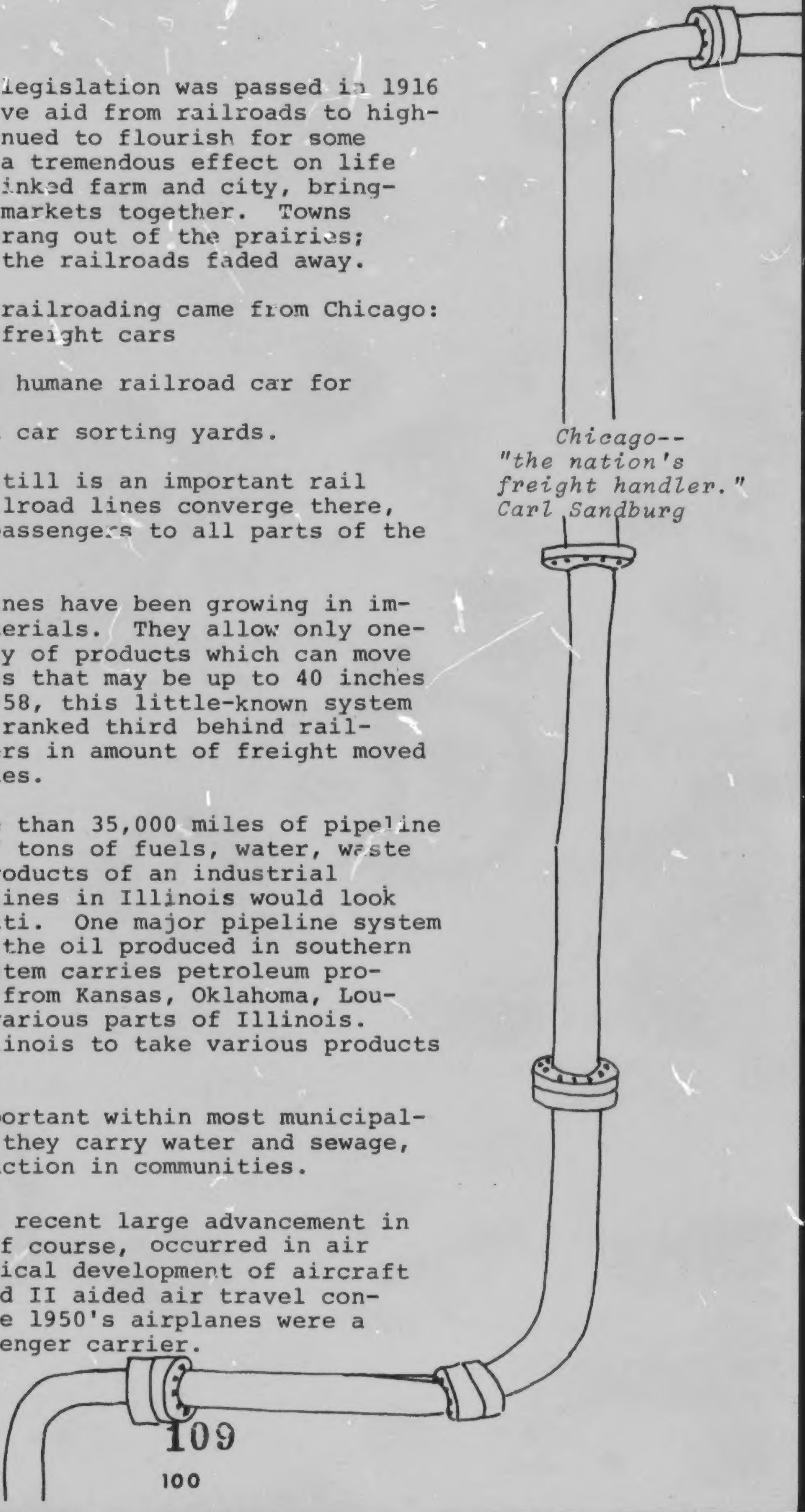
Chicago was and still is an important rail center. Dozens of railroad lines converge there, carrying freight and passengers to all parts of the nation.

Pipelines--Pipelines have been growing in importance in moving materials. They allow only one-way movement, primarily of products which can move in liquid form in pipes that may be up to 40 inches in diameter. Since 1958, this little-known system of transportation has ranked third behind railroads and motor carriers in amount of freight moved within the United States.

Illinois has more than 35,000 miles of pipeline that carry millions of tons of fuels, water, waste material, and other products of an industrial state. A map of pipelines in Illinois would look like a bowl of spaghetti. One major pipeline system carries to refineries the oil produced in southern Illinois. Another system carries petroleum products and natural gas from Kansas, Oklahoma, Louisiana, and Texas to various parts of Illinois. Still others cross Illinois to take various products to states in the East.

Pipelines are important within most municipalities, too. Locally, they carry water and sewage, performing a vital function in communities.

Airways--The most recent large advancement in transportation, has, of course, occurred in air travel. The technological development of aircraft during World Wars I and II aided air travel considerably. By the late 1950's airplanes were a common inter-city passenger carrier.



Chicago--
"the nation's
freight handler."
Carl Sandburg

In the 1940's and 1950's regional carriers, then called "feeder airlines", began to bring passengers from smaller communities into cities such as Chicago and St. Louis, where they could make connections with the large airlines. Today there is a third level of airline, the commuter airline, carrying 6 to 15 passengers and providing service to many communities where the regional carriers no longer go or have never gone.

FROM TEENY TOWN
VIA AIR
TO CHICAGO
FROM CHICAGO
TO LOS ANGELES

Chicago's O'Hare Airport, reputed to be the busiest airport in the world, offers direct air service to most cities of the world--to 231 destinations, more than any other city, according to "The New Chicago", a publication of the Chicago Association of Commerce and Industry. Both passengers and urgently-needed goods such as perishables and mail are handled at airports generally.

Because of its convenience, air travel is here to stay. However, because it uses great amounts of fuel, the air industry is seeking new ways of conserving fuel and studying alternative fuels. Also, our present habit of face-to-face communication may be replaced to some degree by televised conferences and meetings and conference telephone calls, by which a number of people in different places can talk together at a pre-arranged time.

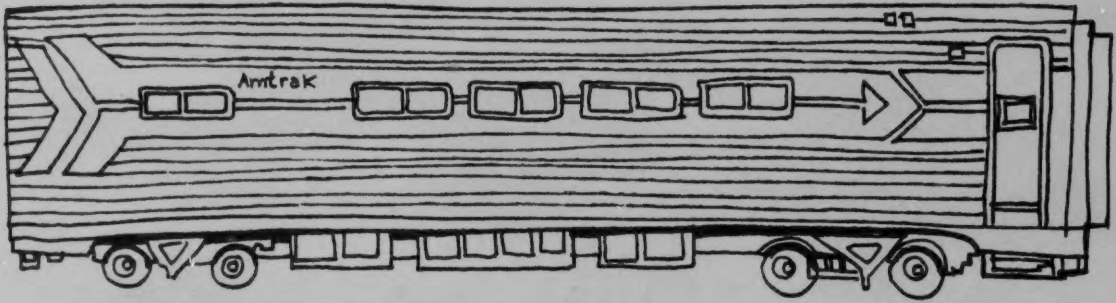
What about mass transportation in Illinois today--As one would expect from the wide range in character of the 102 Illinois counties, the amount and kinds of public transportation presently available vary considerably around the state:

- some rural counties have no public transportation and seem to see no need for it; in a few counties scheduled bus routes have never been profitable
- other counties have some public transportation which seems adequate--bus lines and/or trains
- other areas have public transportation but believe they need more, especially for the aged and handicapped; minibuses might be the answer.
- still other areas would like their public transportation made more efficient--such as improved road beds for Amtrak trains.

Most people are well aware that train service has been reduced in many places and eliminated to towns that had service for years. Some of these communities are served by bus lines, but others have only auto and truck connections. There has been a change in bus service, too, as buses have been increasingly routed over interstate highways, thus eliminating stops in many small towns on local roads. With Amtrak there is the beginning of what many people hope will be a revival in railroad passenger service. Amtrak offers more service in Illinois than in most other states, partly because of the cooperative arrangement with the Illinois Department of Transportation, which absorbs part of any losses. Amtrak trains go from:

Chicago to Carbondale
Chicago to Carbondale and on to New Orleans
Chicago to St. Louis
Chicago to Champaign
Chicago to Dubuque

as well as to hundreds of other towns and cities around the United States. There are complaints about the poor service as well as the bad condition of the road bed which keeps the speed down. These conditions cannot be improved overnight, but people who support train travel believe that a viable railroad system is essential for many reasons--wise use of resources, better air quality, and a better quality of life generally.



Within the City of Chicago, the Chicago Transit Authority (CTA) is the principal mass transportation carrier. Information from the CTA* indicates that the Authority:

- is the second largest public transit system in North America, carrying more passengers annually than all of the nation's railroads, including commuter services
- services all sections of Chicago; with 99% of the city's residents within 3/8 mile of CTA service
- also serves 36 Cook County suburbs
- provides 131 bus routes--over 1,920 miles of Chicago and suburban streets

If the 1,600,000 trips now made daily by transit in the Chicago metropolitan area were made by auto instead, about 140,000 cars would be added to the 36,000 trying to reach the Chicago Loop during the morning rush hour.

*from Chicago Transit Authority, Transit in Chicago, OP-x 74168, April 1, 1974.

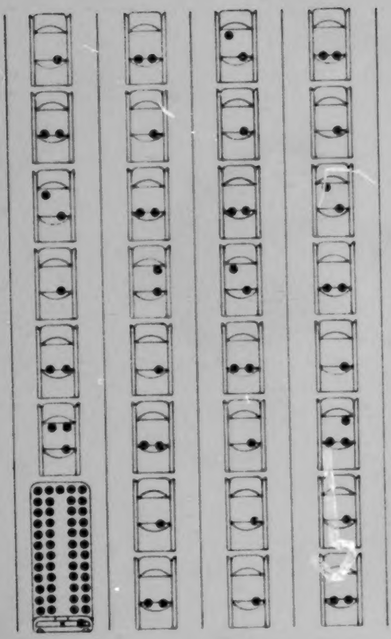
- provides six rapid transit routes
- services over half the routes on a 24-hour day, seven-day week, 365-day a year basis
- operates about 2,500 motor buses and 1,100 rapid transit cars.
- carries over 2 million revenue riders on a typical weekday.

In March, 1974, voters approved a referendum setting up a Regional Transportation System (RTA) in the six counties of Cook, DuPage, Kane, Lake, McHenry, and Will. This Authority may purchase service agreements, make grants to transportation agencies, and provide transportation service. The RTA works to improve regional transportation by:

- coordinating the various schedules and routes of the City (of Chicago) and suburban systems
- integrating the various fare systems
- reimbursing the CTA and private transportation companies for losses.

In keeping down the use of autos, public transportation in any area helps the environment not only by improving air quality, using considerably less fuel, and cutting down on traffic congestion (thus improving people's mental and physical health), but also keeps down the tax bill for building more streets, highways, and expressways.

A few of the Chicago suburbs, in an effort to prevent congestion and parking problems at their local stations, have started successful shuttle bus service to the station for commuters.



1 bus can carry 50 people, often as many as 30 cars

(From Health and Growth Book Aid, by Julius Richmond, et al, Scott-Foresman, 1974.)

Downers Grove, a community of 40,000 people thirty miles southwest of Chicago, was the first community in northeastern Illinois and perhaps in all of Illinois to inaugurate a commuter shuttle bus service. In October, 1973, the service began with three buses run by a commercial busline under a contract with the Village. Convinced of the importance of this service, the Village government purchased and began to operate three buses. Increased ridership resulted in the Village purchasing four more buses. Then in May, 1975, daily mid-day service was begun for shoppers, senior citizens, students from the local college, and others. The buses can also be chartered by local civic groups, churches, and the local park district.

In October, 1975, this service became self-supporting. By November, 1975, 900 commuters and 125 mid-day riders were using the service daily.

In Chicago about 25% of the households do not have cars.

Why is mass transportation important? Some people, especially the aged, the handicapped, and the poor, do not have automobiles, and others consciously decide not to own them. These people need to get to where there are goods, services, entertainment, and people to visit.

The auto is not efficient in the number of passengers it carries. In 1973, Environmental Protection Agency Administrator William Ruckelshaus said,

> "Statistics now show that the rate of occupancy of cars during peak load periods is down to 1.2 persons per vehicle, and at the present rate of passenger decline, by 1980 one out of every three cars will be tooling around without a driver."*

RIDE THE CTA

A brochure published by the CTA Department of Public Affairs, October, 1975, gives the following information:

How Public Transportation Helps the Environment

Rapid Transit	room for 49 seated riders per car
Bus	room for 50 seated riders per bus
Automobile	room for 5 seated passengers per auto

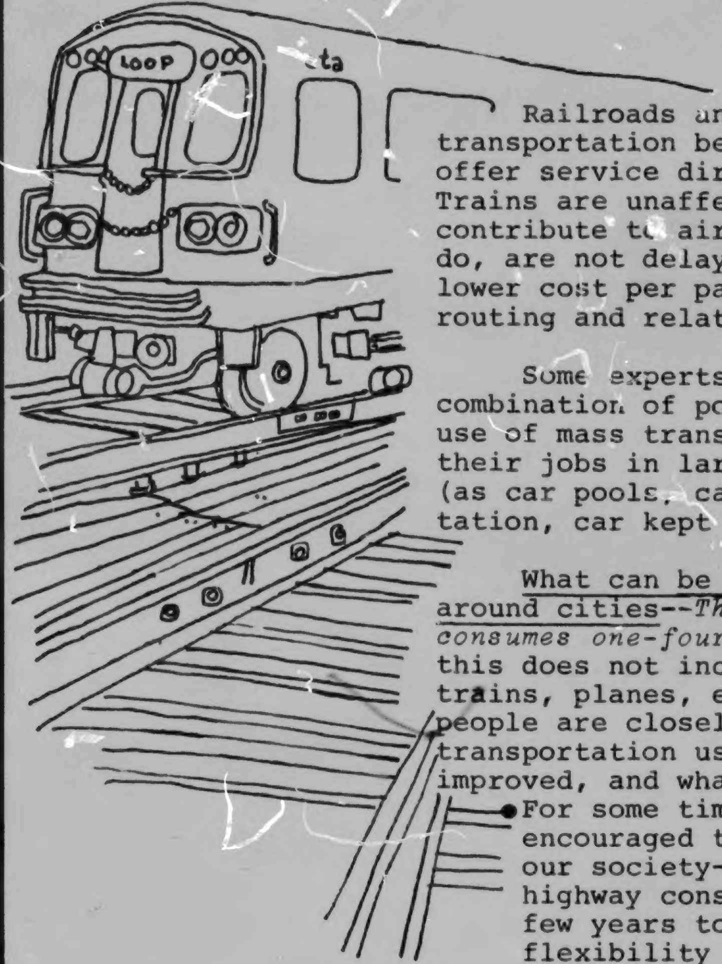
Auto produces 330 times as many pollutant emissions as a rapid transit train.
Auto produces 13 times as many pollutant emissions as a diesel bus.

(Public Transportation) Saves Fuel, also--
Rapid Transit--320 passenger miles per gallon
Bus --246 passenger miles per gallon
Auto --17.7 passenger miles per gallon

Each weekday Chicago avoids air pollution of about 2000 tons of hydrocarbons, carbon monoxide, and oxides of nitrogen due to the availability of our excellent public transportation services, including commuter trains.

from Public Transportation in the Chicago
Metropolitan Region
Development Research Associates

*Hidden Waste by David B. Large (ed)., p. 79.



Railroads and bus lines are important for public transportation between towns and within cities. Both offer service directly to the center of the city. Trains are unaffected by weather conditions, do not contribute to air pollution on the scale that cars do, are not delayed by traffic congestion, and have lower cost per passenger mile. Buses offer flexible routing and relatively inexpensive transportation.

Some experts suggest that what is needed is a combination of policies that encourage both increased use of mass transportation by people who commute to their jobs in large cities and better use of autos (as car pools, car used to nearest public transportation, car kept well-tuned).

What can be done relatively easily in and around cities--*The transportation of people and goods consumes one-fourth of our total energy budget* (and this does not include energy used to *produce* cars, trains, planes, etc.). With the energy crisis many people are closely examining how various modes of transportation use energy, how this use could be improved, and what alternatives there are.

- For some time, Federal government policies have encouraged the most energy-intensive vehicle in our society--the automobile--by allocations for highway construction. The change in the last few years to allow local governments greater flexibility in allocating Federal Highway Trust Fund monies has been a recognition that other forms of transportation may be more efficient in energy use as well as more desirable in other ways.
- There is experimentation with school buses for public transportation before and after the hours the buses are needed for school children.
- Some companies have bought 12-passenger vans and buses and have found employees to drive them to work, with various incentive plans to get drivers.

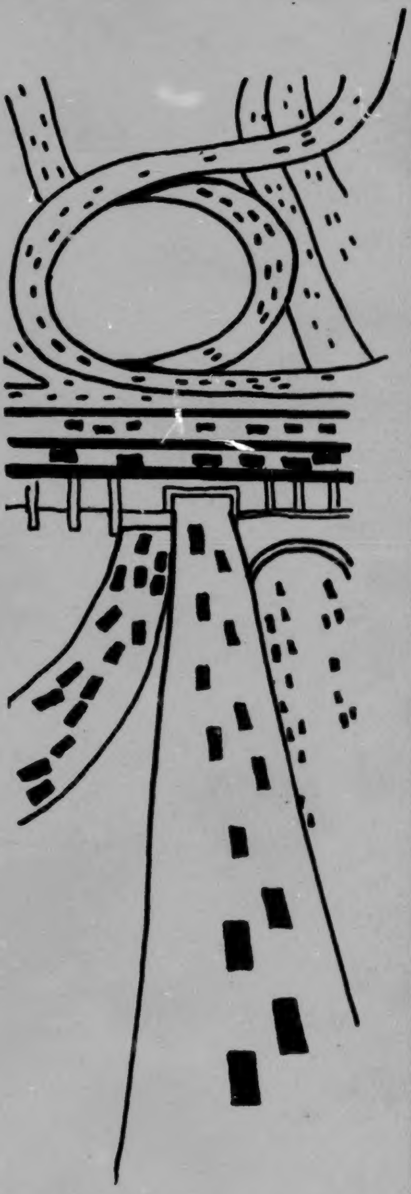
The great concentration of the transportation load in and around cities is the journey to work and return. What is being done to improve this situation?

- curbing the use of autos in the center of cities through decrease in parking lots and spaces, increased cost of parking, better traffic flow, one-way streets, and pedestrian malls
- spreading out the peak which has tended to be between 7:00-8:00 by staggering starting times

in plants and offices: 6:00-7:00, 7:00-8:00, 8:00-9:00

- adding "bus only" lanes on freeways (this designation along with staggering the hours expands the effective size of the road system)
- initiation of "jitney" services to augment public transportation; perhaps company-owned buses or taxi fleets
- addition of minibus feeder systems added to basic transit systems; school buses might be used.

Can you suggest other experiments?



What can be done over a longer period of time--

- improvement of mass transportation in metropolitan areas would seem to be of first importance--improved rail and bus service, coordination of present separate systems, experimentation with other kinds of mass transit, linking airports with downtown business areas by rapid transit
- revitalization of long-distance rail travel seems to be under way with Amtrak; public reaction could have an effect on its extent
- increase of traffic handled by the Port of Chicago as containerization facilities are made available
- growth of new self-sufficient communities or major new developments within cities (new towns-in-town) may be two of the more desirable results of the energy shortage. Energy conservation can be built into communities if mini-bus systems and bikeways are provided, if shopping areas and services are located within walking distances from homes. Some experts point out that traditional zoning patterns which reinforced dependence on cars by isolating uses are now being changed as awareness of the costs of energy use grows. Cities could experience an unexpected rejuvenation as a result of energy shortages. Development away from towns and cities and thus away from goods and services may well be cut back, saving farm land needed to grow crops as well as saving fuel.

What other long-range measures can you think of? Consider their advantages and drawbacks.

THINGS TO DO:

▶ Consider how transportation has affected the development of the Midwest and the Great

Plains--settlement, farming, industry, growth of cities, and so on.

- Discuss the statement that the history of civilization is the history of transportation.
- In considering present or proposed highways or toll roads, think about the environmental effects of roads: how much land they require--for roadbed itself plus cloverleaves and other exit-entrance roads; the amount of good agricultural land they take out of production; the increase in runoff water from rain and melted snow, which may go into creeks and pipes and flow from the area rather than soaking into the ground and adding to the water table; the effects of salt used on icy and snowy roads which gets into the runoff water; other effects of covering the earth with concrete.
- Walk along the tow path of the Illinois-Michigan Canal from Channahon to Morris. Imagine how it was 100 years ago.
- For a school group, club, or organization to arrange a tour of the Port of Chicago at Lake Calumet, contact Paul Pella, Assistant General Manager, Chicago Regional Port District, Lake Calumet Harbor, Chicago 60633, (312) 646-4400.
- Try to track down information on the lengths of pipeline in your community; contact your town hall, sanitary district, water department.
- Keeping in mind that the transportation of people and goods consumes one-quarter of our nation's total energy budget and that this transportation has depended almost entirely on oil, consider alternatives to oil.
- Make a survey of the mass transportation in your community; do you think it is adequate? If not, what can you do about it alone or with others? Where can you go for information? (See chapter on Who Makes Environmental Decisions?)
- If you see a need for shuttle bus service in your community, talk to your local officials. Get information on the Downers Grove shuttle bus service by writing or phoning: Harvey Friedl, Department of Transportation, Village of Downers Grove, 801 Burlington, Downers Grove 60515, (312) 964-0300.
- Write the Chicago Transit Authority for information: Merchandise Mart Plaza, P.O. Box 3555, Chicago 60654.
- Write the Regional Transportation Authority for information: 300 N. State Street, Chicago 60610.
- If you travel on Amtrak trains, write letters

of support or complaints with suggestions for improvement.

- ▶ Use the following figures to calculate:
  - ● how much fuel each person uses when traveling by plane, train, or car;
  - ● which kind of transportation uses the least fuel per person;
  - ● which kind of transportation uses the most fuel per person;
  - ● if each car carried only two people, which would use the most fuel?

Kind of Transportation	Miles Traveled	Number of Passengers	Gallons of fuel
1 plane	500	360	3,9il
*90 cars (4 people each)	500	360	3,316
1 train	500	360	1,238

*1970 data showed that autos traveling between cities carried 2.4 passengers, however, not 4! (from Less Power to the People. Available from Environmental Action Coalition, 235 East 49th Street, N.Y.; N.Y. 10017. Price $2.50 to members, $5.00 to non members.)

▶ Compare different modes of freight transportation for energy-efficiency, using the following table:

Energy-Efficiency for Inter-City Freight Transport (1970)

Mode	Energy Cost (BTU's needed per ton-mile	Economic Cost (cents per ton-mile)
Pipeline	450	0.27
Waterway (barge)	680	0.30
Railroad	700	1.04
Truck	2,800	7.50
Airplane	22,000	21.90

Source: Oak Ridge National Laboratory (from Hidden Waste. David B. Large (ed). The Conservation Foundation, Washington, D.C. 1973. Out of print. p. 75.)

▶ Compare different modes of inter-city passenger transportation for energy and economic costs.

Energy and Price Data for Passenger Traffic
(1970) Inter-City

Mode	Average Carrying Capacity	Average Load Factor	Energy Cost BTU's ppm*	Economic Cost cents ppm*
railroad	69 (per car)	35%	2,900	4.0
bus	41	45%	1,600	3.6
automobile	5	48%	3,500	4.0
airplane	106	50%	8,400	6.0
		Urban		
bicycle	1	100%	200	-
walking	-	-	300	-
bus	55	20%	3,800	8.3
automobile	5**	28%**	8,500	9.6

Source: Oak Ridge National Laboratory

*ppm - per passenger-mile

**(autos traveling between cities carried 2.4 passengers in 1970, compared to only 1.4 in intra-city driving. More recent data puts rush-hour usage at only 1.2 passengers.)

a free ride

BOOKS TO ENJOY:

Burton, William L. Illinois: A Student's History of the Prairie State, Panoramic Teaching Aids, Inc., 1969.

Howard, Robert P. Illinois: A History of the Prairie State, William B. Eerdsman Publishing Co., 1972.

Illinois Guide. A Descriptive and Historical Guide. A.C. McClurg & Co., 1939. Republished 1973.

Illinois Guide and Gazetteer. Rand McNally. 1969.

Large, David B. Hidden Waste (ed). The Conservation Foundation, Washington, D.C. 1973. Out of print.

Luna, Charles, The UTO Handbook of Transportation in America. Popular Library. 1971. Adult.

U.S. Senate, Readings on Energy Conservation. selected Materials compiled by the Congressional Research Service at the request of Henry M. Jackson, Chairman. Committee on Interior and Insular Affairs, pursuant to S. Res. 45, The National Fuels and Energy Policy Study. 1975. Serial No. 94-1 (92-91). Order from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. $4.80.

A brochure, "Sail the Seaway and Save", is available from the Chicago Regional Port Authority, Lake Calumet Harbor, Chicago 60633. This brochure contains:

- cargo information
- imports and exports in 1973--non-Canadian overseas commerce
- locking procedures
- locks and channels
- foreign countries and ports of call served
- ports of call and steamship lines
- key Great Lakes Organizations
- publications on the Great Lakes
- table of sailing distances between Great Lakes ranges and 41 overseas destinations

Importance of Land Use

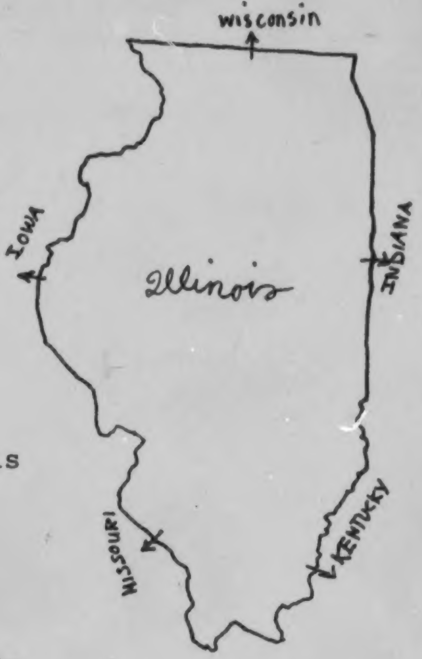
Land use is a subject, like environment, that is all-encompassing. It is also quite controversial. As you look around and perhaps become more concerned and knowledgeable about environmental issues, you will probably find that you inevitably get back to land use.

There are at least two ways this chapter could be approached. One is to focus on the utilitarian consideration of land--the activities on it such as production, transportation, trade, and siting of buildings. Another is to talk about land in terms of natural features--the topography and geology--that interact with people's use of it, and how the features were formed and to keep environmental concerns uppermost. While traditionally, the economic approach has been dominant in considering land use, the general orientation of the Sampler led to the second approach.

General Description of Illinois

Let's begin by considering some information that will help us to "think Illinois". Just where is it? Actually its location can be given in various ways:

- in the solar system
- on planet earth
- on the North American continent
- in the United States of America
- in the Midwest--bordered on the north by Wisconsin, on the east by Indiana, on the southeast and south by Kentucky, on the southwest by Missouri, and on the northwest by Iowa.



Size

About 56,400 square miles, almost as large as all six New England states; close to 400 miles from north to south and just over 200 miles at the widest east-west points; larger than such nations as Austria, Belgium, Czechoslovakia, Greece, and Hungary.

Topography

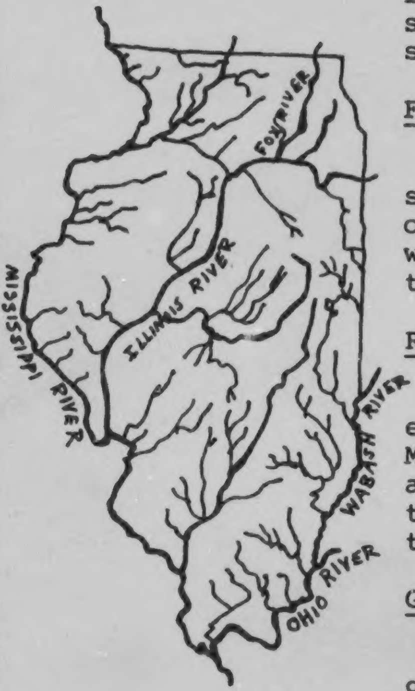
Illinois has only a slight slope down from Lake Michigan (about 600 feet above sea level) to the Mississippi River except for Charles Mound in the far northwest county (Jo Daviess County), the highest point in the state with an altitude of 1,235 feet. The lowest land, about 300 feet above sea level, is near the confluence of the Ohio and Mississippi Rivers. While a section of the Ozark Mountains extends across southern Illinois and the western edge of the state is generally rolling and hilly, most of Illinois is flat prairie land.

Climate

Average temperature 52 degrees; with the range from 105 degrees to more than 20 degrees below zero; average rainfall, most of which comes from the Gulf of Mexico, 34 inches annually in the north and 40 inches in the south, well distributed; growing season ranging from 150 days in the north to 200 days in the south; the extreme southern part having a growing season long enough for cotton.

Forests

At the time settlement began, 40 percent of the state was covered with forests. Today the figure is only 10 percent. Much of the land cleared for crops was not suited for agriculture, and a large part of this land is now being reforested.



Rivers

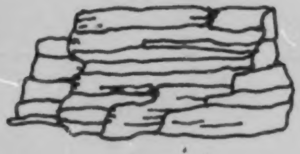
The river system in Illinois is one of the most extensive of any state in the United States. The Mississippi River forms the entire western boundary, and the Ohio and Wabash Rivers border the state on the south and southeast. These rivers and their tributaries form a system of more than 280 streams.

Geology and Soils

To understand Illinois as it is today, one must go way back in prehistory. Millions of years ago most of Illinois was a low coastal plain bordered on the west and southwest by a shallow sea. A large variety of plants grew in vast swamps that covered this area. When the plants died, they formed great masses of peat that were eventually covered by warm, shallow seas. They became buried beneath mud and sand. Periodically the seas receded, new swamps developed, and more sediments were deposited. The sediments gradually were compacted and hardened and resulted in sandstones, limestones, shales, and coal (the latter formed from tropical trees and ferns).

Petroleum is a fluid that is found in some sedimentary rocks (sandstones, limestones) in Illinois. There are several explanations about how petroleum originated. The most widely accepted idea is that millions of years ago, when billions of animals and plants died in the seas, their remains decomposed, formed gas and oil, were buried under sediments, and were squeezed into the spaces in the sedimentary rocks which had also been formed.

shale

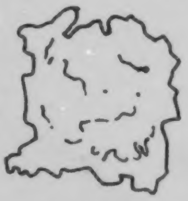


limestone

Long ago, too, when a shallow ocean covered Illinois, silica sand, composed almost entirely of quartz grains, was produced. With hundreds of feet of other sediments deposited on top of the sand, it became compacted into sandstone.

Glaciers, also, helped form our natural resources. Four separate times these huge masses of ice spread southward and covered parts of Illinois. The glaciers exerted tremendous force and moved enormous mounds of boulders, rocks, dirt, and sand--whatever was in the way. The third glacial period reached the farthest south of any in North America. The glacier covered 90 percent of Illinois--all except the seven southernmost counties and areas in Jo Daviess and Calhoun Counties.

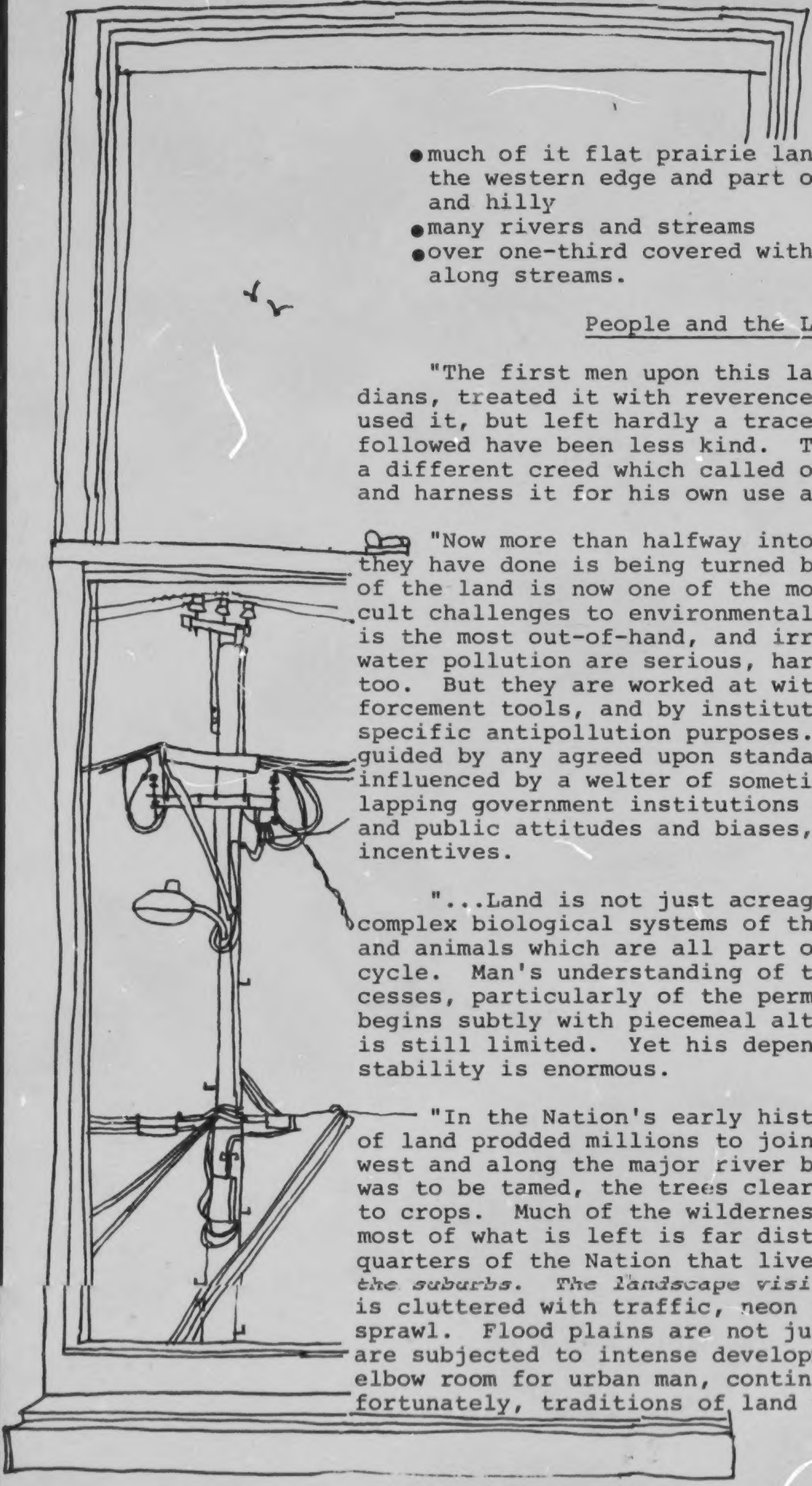
The glaciers sheered hills and filled valleys with the materials they brought. This leveling action resulted in the flat surface of much of the state. The surface material left by the glaciers ranges from a few to 500 feet in thickness! As the edges of the ice melted, the loads of rock material were left as ridges (moraines) which formed the mounds and hills of the flat prairies.



Copper

Illinois contains some of the richest soil in the world. This soil is considered by many to be one of the state's most valuable resources, if not the most valuable. The soils are fertile partly because of the minerals and trace elements (minute amounts of elements such as copper, zinc, and manganese) brought by the glaciers. These soils were enriched when prairie grasses and other plants died and decayed over thousands of years, resulting in a productive layer of soil several feet thick in many places.

Try to picture this Illinois land as it was before the first white men came--ONLY A LITTLE OVER 300 YEARS AGO--a blink of an eye as far as geological time is figured:



- much of it flat prairie land with rich soil, the western edge and part of the south rolling and hilly
- many rivers and streams
- over one-third covered with forests, primarily along streams.

People and the Land

"The first men upon this land, the American Indians, treated it with reverence, blended with it, used it, but left hardly a trace upon it. Those who followed have been less kind. They brought with them a different creed which called on man to conquer nature and harness it for his own use and profit.

"Now more than halfway into the 20th century what they have done is being turned back upon them. Misuse of the land is now one of the most serious and difficult challenges to environmental quality, because it is the most out-of-hand, and irreversible. Air and water pollution are serious, hard to manage problems, too. But they are worked at with standards, with enforcement tools, and by institutions set up for those specific antipollution purposes. Land use is still not guided by any agreed upon standards. It is instead influenced by a welter of sometimes competing, overlapping government institutions and programs, private and public attitudes and biases, and distorted economic incentives.

"...Land is not just acreage. Land embraces the complex biological systems of the soil and the plants and animals which are all part of a continuing life cycle. Man's understanding of these biological processes, particularly of the permanent damage that begins subtly with piecemeal alterations of the land, is still limited. Yet his dependence upon its stability is enormous.

"In the Nation's early history, easy availability of land prodded millions to join the massive migrations west and along the major river basins. The wilderness was to be tamed, the trees cleared, and the soil put to crops. Much of the wilderness is now gone, and most of what is left is far distant from the three-quarters of the Nation that lives in the cities and *the suburbs. The landscape visible to most Americans* is cluttered with traffic, neon signs, powerlines, and sprawl. Flood plains are not just for the river but are subjected to intense development. Open space, the elbow room for urban man, continues to dwindle. Unfortunately, traditions of land use have derived from an assumption that land is a limitless commodity--not a finite biological community.

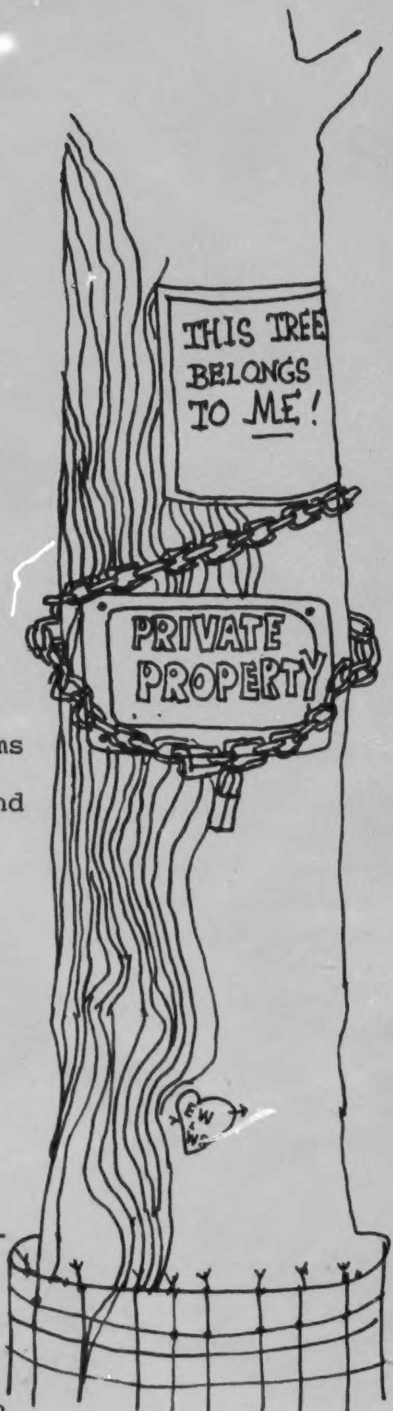
"Government spurs much of this land development by where it locates and how it designs airports and highways, insures home loans, permits filling of wetlands, and lays water and sewer lines. Local governments exercise the primary authority over land use. But effective public influence is hampered by a lack of agreement on objectives, by misplacing economic incentives, and by failure of local governments to harmonize land use."*

The American Indians believed that the Great Spirit gave the land to them as he gave them air and water. To them the land belonged to their ancestors who were buried in it, to the people presently using it, and to their children's children who would use it in the future. When the settlers tried to buy land, the Indians, with such a different concept of land, intended only to offer its use for growing food. No wonder there was conflict!

In our own society the attitude toward land seems to be determined mainly by current economic factors, with little or no thought of custodianship of the land for future generations. We view land as property, a western concept which colors our thinking about it. Is such an attitude appropriate for the earth as it is today? Is this attitude changing? How can you help it change, if you so desire?

In the United States the role of the Federal government in land use probably will not be in the European pattern of strong national authority, but rather just the opposite. The land use legislation being discussed in Washington, D.C., offers planning assistance and encouragement for the states to take responsibility for land management. In Illinois, the State has not played a major role in land use except in control of transportation--highways, waterways, and airports. The counties and local governments have been involved in whatever government planning has occurred.

There has been a fairly long history of zoning and concern for the public interest in the U.S., with limits put on an owner's use of land. Often, however, an owner used his land as he wanted with little con-


THIS TREE BELONGS TO ME!
PRIVATE PROPERTY
EW

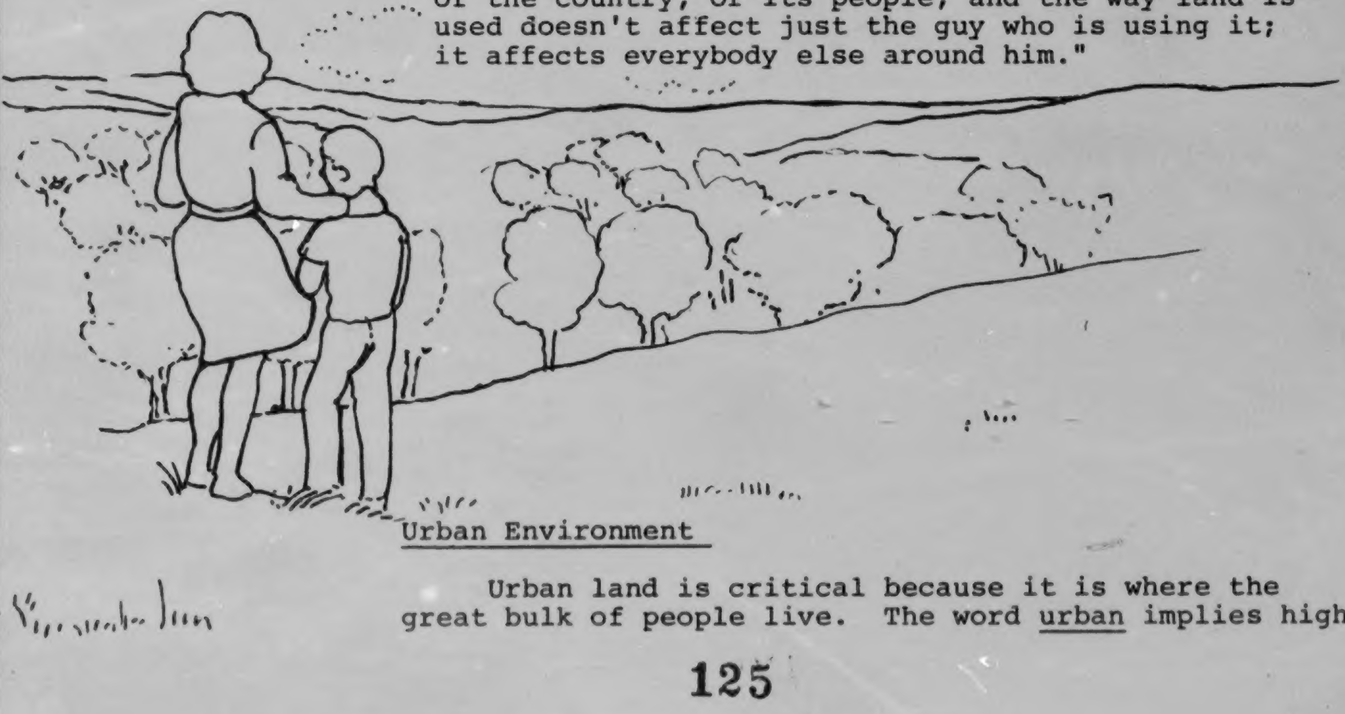
---

*from Environmental Quality, The First Annual Report of the Council on Environmental Quality, Office of the President. August, 1970, pp. 165-166.

sideration of what the land could support or how the use would affect other people and other parts of the environment, the concept of "highest and best use", if that is what the owner wished. This tenet only in economic terms has resulted in much abuse of land. As you look around, can you see examples of soil erosion and siltation, flooding, visual pollution, change of drainage patterns, destruction of prime woodland or agricultural land through urbanization, or incompatible uses caused by the desire for profits and/or lack of concern for others? With Illinois' importance in agriculture, for example, it is important to ourselves as Illinoisans as well as to our country and to the world how we handle our soil resources. Some people urge us to change our priorities from use and abuse to conserve and re-use.

Concern for the rights of the majority and for the effects of land use on the physical and biological environment seems to be growing. Russell E. Train, former chairman of the Council on Environmental Quality and now Administrator of the U.S. Environmental Protection Agency, indicated in a newspaper article several years ago that:

> "Land use is the area that potentially is far more important than the environmental pollution problems we have been worrying about, as far as its contribution to the quality of life is concerned...Land is our most finite resource. It's the basic resource of the country, of its people, and the way land is used doesn't affect just the guy who is using it; it affects everybody else around him."

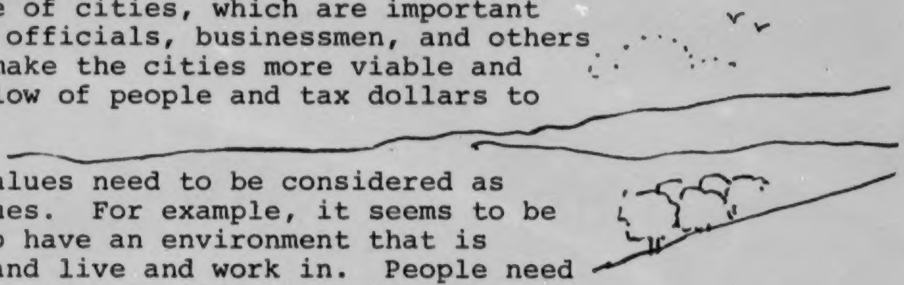


Urban Environment

Urban land is critical because it is where the great bulk of people live. The word urban implies high population density. Northeastern Illinois is where almost 7 out of the 11 million residents of Illinois live. What makes cities valuable is their density and what is provided in relatively small areas. But this results in environmental conflicts, in a strain on land, air, water, and open space, in pressures due to noise and traffic. Density is not bad unless it is badly planned and results in crowding, with not enough open space and opportunity for privacy and quiet.

Because of the interrelationships and interdependencies, the use of land in a metropolitan area has an effect on rural areas hundreds of miles away. No matter where you live, consider how you rely on other areas of Illinois (and other states and other countries) for your food, clothing, and other products and services.

For decades there has been a shift of population from rural to urban areas. Somewhat recently the shift changed and is now going from city to suburb. With this change the tax base of cities has decreased, sections of cities have decayed and are not being renovated or are being renewed slowly. Competition from industrial, commercial, and shopping areas out of the cities attract people away from cities. Fortunately for the future of cities, which are important to our society, many officials, businessmen, and others are working hard to make the cities more viable and alive, to stem the flow of people and tax dollars to the suburbs.



Social, human values need to be considered as well as economic values. For example, it seems to be a basic human need to have an environment that is pleasant to look at and live and work in. People need space to live, stroll, and play in. Actually, few cities have kept up with the need for parks but there seems to be increasing understanding that open space is vital. Plazas, miniparks, small landscaped sections in parking areas are all increasing. Open spaces that separate zones in cities perform many important functions--aesthetic, health, climatic, and so on.

Among other attempts to make the urban environment a better place are:

- curbing the use of autos in the center of the city to improve air quality--with improvement in the quality of life generally
- encouraging high density zones with mixed uses or specialized functions. These may be both residential and work places. With the energy

shortages, with people wanting to spend less time going to and from work, areas of mixed uses may be accepted more generally. Residential uses can be mixed with small retail facilities, commercial areas, planned industrial districts, and scattered industry.

- renewing of older areas to make congested, blighted areas livable. When people become too crowded under daily living conditions, crime, juvenile delinquency, and other social problems may increase. In St. Louis, for example, huge buildings which some people found they could not live in safely and agreeably have been torn down. What might have been preferable? Might a mix of housing be better so people can have a choice? Along with other aspects to make the community attractive (recreation areas, stores, medical centers, public transportation) a mix of housing is being provided in some places.
- resolving such questions as in what areas should residential and industrial development be encouraged? where discouraged? where are they compatible?

New Towns

Look for "New Town" sections within existing cities.

To some planners, "new towns" are considered more promising than renewal of our cities. These planners may envision a satellite suburb bound to a large city or a separate, independent town with its own services, theaters, stores, industry, and so on. Often housing developments are advertised as new communities. While they may offer good housing and even recreational facilities, most lack the many facilities that make a town a viable, vital place.

In your observations consider which values were most important to the developer or to the resident. Look at the impacts of a development on surrounding land and people.

Suburban Environment

With the movement from city to suburb, open space is continuously being taken up by housing, highway interchanges, shopping centers, airports, light industry, and other land uses. There is less and less agricultural land nearby as well as less public open space.

You may want to learn about the zoning in your community and whether the newer concepts such as "cluster zoning" and "planned unit development" are encouraged. (See section on Zoning in this chapter.) Does your community have an open space plan? Is flood plain kept in open space or approved for development?

Thoughtful planning is necessary if what was diversified rural landscape with fields and woodlots before development is not to give way to urban-suburban sprawl, monotony, and even ugliness.

Rural Environment

Many rural areas are also being affected by change. Consolidation of small farms and mechanization of farms have caused the move from farms and small towns to urban areas. On the other hand, many rural areas have been touched by urban and suburban expansion which has reached out to them. It is obvious that each year more rural land is converted to non-agricultural use. What does this mean for future food supplies? Once covered by development the land becomes changed and can never be restored to its former agricultural productivity.

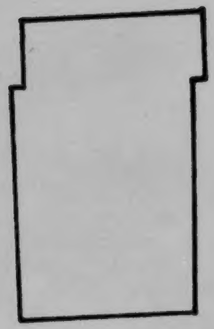
Many rural communities are lively places, but others need renewal. People in the latter towns might examine the qualities that make the community attractive to themselves and perhaps to outsiders. Open space and architectural charm might be important as well as retaining the flavor of that specific community, the identity that sets it apart from all others. Long-range planning would seem necessary to avoid undesirable commercial and residential development.

In some rural areas regional commissions or planning bodies concerned with revitalization have drafted guidelines for land use. They may seek advice from ecologists who help them understand the destructive side effects of some proposed development and from local college architectural and planning departments and local conservation groups. If you live in a rural area, is revitalization needed? If so, is it going on? Are you helping the process? A comprehensive analysis of a town's present assets is a good place to begin. Students could make such an inventory of their town environment.

Illinois is a state with great contrasts in population density. Take a look at the following table.

Illinois Population by Counties from 1970 Census

cook

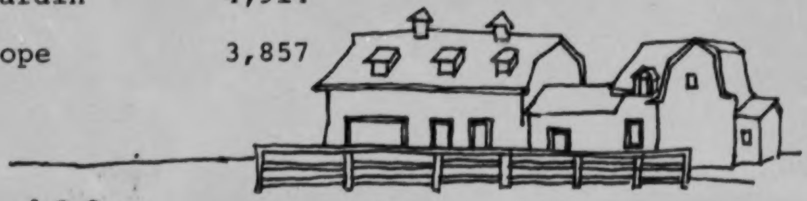


Kane

(Illinois	11,109,935)	Williamson	49,021
Cook	5,488,328	Stephenson	48,861
DuPage	491,882	Coles	47,815
Lake	382,638	Macoupin	44,557
St. Clair	285,176	Ogle	42,867
Kane	251,005	Fulton	41,890
Madison	250,934	Livingston	40,690
Will	249,498	Marion	38,986
Winnebago	246,623	Bureau	38,541
Peoria	195,318	Franklin	38,329
Rock Island	166,734	Lee	37,947
Champaign	163,281	McDonough	36,653
Sangamon	161,335	Morgan	36,174
Macon	125,010	Christian	35,948
Tazewell	118,649	Logan	33,538
McHenry	111,555	Iroquois	33,532
LaSalle	111,409	Jefferson	31,446
McLean	104,389	Randolph	31,379
Kankakee	97,250	Montgomery	30,260
Vermilion	97,047	Clinton	28,315
DeKalb	71,654	Woodford	28,012
Adams	70,861	Grundy	26,535
Whiteside	62,877	Kendall	26,374
Knox	61,280	Saline	25,721
Jackson	55,008	Boone	25,440
Henry	53,217	Effingham	24,608

Hancock	23,645
Shelby	22,589
Jo Daviess	21,766
Warren	21,595
Edgar	21,591
Fayette	20,752
Crawford	19,824
Perry	19,757
Carroll	19,276
Pike	19,185
Douglas	18,997
Monroe	18,831
Jersey	18,492
Lawrence	17,522
White	17,312
Mercer	17,294
Greene	17,014
Wayne	17,004
DeWitt	16,975
Richland	16,829
Ford	16,382
Clark	16,216
Mason	16,161
Union	16,071
Piatt	15,509
Clay	14,735
Cass	14,219
Bond	14,012
Massac	13,889
Washington	13,780
Marshall	13,302
Moultrie	13,263
Wabash	12,841
Alexander	12,015
Jasper	10,741
Cumberland	9,772
Menard	9,685
Pulaski	8,741
Hamilton	8,665
Henderson	8,451
Schuyler	8,135
Johnson	7,550
Stark	7,510
Gallatin	7,418
Edwards	7,090
Scott	6,096
Calhoun	5,675
Brown	5,586
Putnam	5,007
Hardin	4,914
Pope	3,857

Lake



You might want to consider the implications for counties of various size populations. Take a specific issue from the point of view of a more populated and a less populated county. For example, take the problem of locating a sanitary landfill site in a county such as Champaign with over 163,000 people and its neighbor to the south, Douglas, with about 19,000 residents; or the problem of providing water for domestic use in Sangamon County (over 160,000 people) compared to Wabash County with fewer than 13,000.

Planning

A businessman who is efficient and a good manager knows what his business resources are and plans for the future. Many people believe that it is even more important for governmental bodies, especially those at the local and county levels, to plan carefully for the development of our vital land resource. They urge citizens to be informed about what is going on, to participate in hearings held by planning and zoning bodies, and to let their desires be known about what kind of community they want.

Is there enough land in your community for recreation, parking, industrial development, etc.?

In looking at various aspects of your environment, you may have been conscious of the many ways land is used:

- for housing, parks, beaches, and other open spaces
- for schools, libraries, museums, city halls, and other government buildings and other institutions
- for streets, parking lots, freeways, railroads, airports, sewage plants, pumping stations, power lines, sewage line, power plants
- for stores, factories, commercial buildings, laboratories, farms, gravel pits, quarries, strip mines.

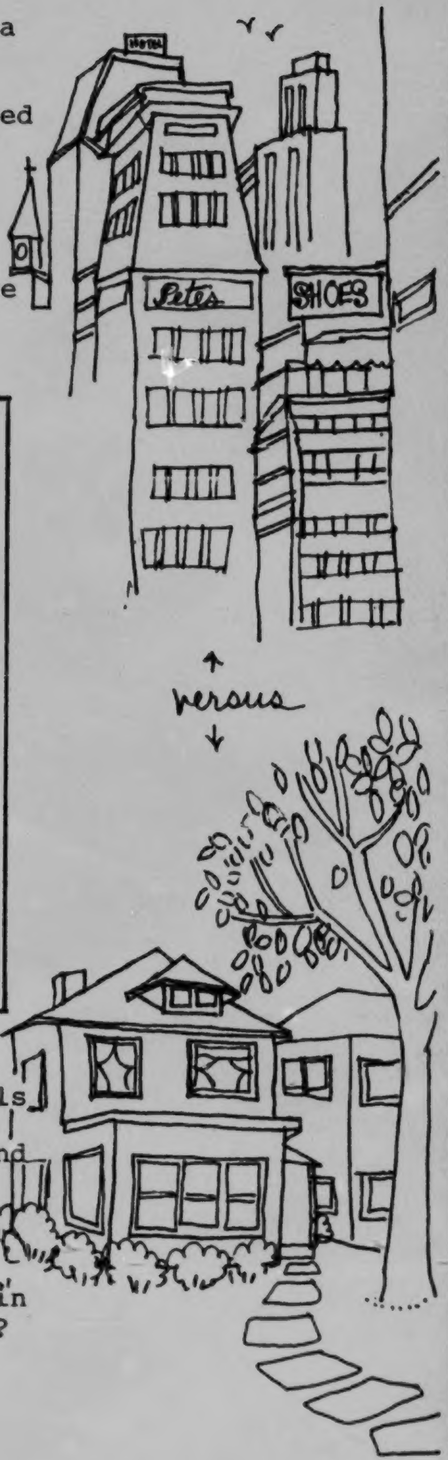
Perhaps you have come to realize that the viability of a community depends to a large extent upon the kind and quality of the use of land.

Since cities exist for people, it seems appropriate to consider:

- What kind of a city do people want to live in?
- What makes living and working in a town or city pleasant?
- Is there diversity to meet various people's needs and desires?
- What is good for the eye and the spirit as well as for someone's pocketbook?

How did cities and towns get the way they are? Historically, there was an accumulation of growth. People may have settled there originally because of a desirable natural feature. Later, availability of transportation undoubtedly influenced development. Growth proceeded logically with each decision affected by earlier decisions and affecting later decisions. At some point planning and zoning may have entered the picture.

Most planning occurs at the local level. Many Illinois communities have plan commissions which have prepared guides for the growth of their community. These plans are implemented in part by zoning.



For help in making long-term decisions, planners and government officers can make use of the excellent services of the Illinois State Geological Survey in Urbana and Warrenville. The Survey can provide scientific and technical data of various kinds--geological, mineral-resources evaluation, and topographic (physical features) mapping.

This Survey has been gathering information since 1905 when it was established as an agency of State government affiliated with the University of Illinois. The results of the Survey's field and laboratory findings are published and made available to all citizens upon request. Much unpublished information in the Survey's open files may be examined by the public. In addition, requests for information are answered by members of the Survey's scientific and technical staff.

Land planners use the following categories of land. (You will note that land is classified by how it is used rather than by how it looks, what the soils are, or by any other factors.)

residential
industrial
commercial
services
transportation, communication, and utilities
cultural, entertainment, and recreation
agricultural and vacant.

As you look around, you might keep these categories in mind. Can you tell which category fits what you see? Is there a mix of uses? If so, why do you think it happened?

Land value and land use are interrelated.
What seems to you to make land valuable?

- basic transportation?
- availability of sewers?
- location?
- proximity to bodies of water?
- availability of utilities?
- topography and soil conditions?
- other considerations?

According to the 5th Annual Report of the Council on Environmental Quality, Office of the President,*

> "...citizens in many communities share a feeling that the development process is out of control, that decisions are made which benefit only the influential developers' interests, and that piecemeal changes are having unpredictable cumulative effects on the quality of life... The reaction in many localities is a strong citizen effort to slow or stop growth," but "The issue is not growth or no growth. Rather, it is how and where and under what conditions growth should occur."

Local planning is sufficient for some purposes, but other planning has to be regional to be effective, i.e., for highways and water resources, where the land use in one area affects a larger region and effects can be anticipated in the other parts of the region. Costs--environmental and social as well as economic--and benefits of various land uses can be taken into consideration.

The planning concepts of regionalism and comprehensiveness are gaining increasing support in Illinois and across the nation. A truly regional viewpoint recognizes that the problems of the city and suburbs do not end at city or state lines. A truly comprehensive viewpoint recognizes, for example, that planning for transportation to serve people where they live, work, and shop should be part of planning for population growth and distribution and land use.

Good land use can be economically feasible. It has been found that planning with social and environmental concerns can lead to economic gain as well; for example, there is increasing evidence that strategically placed open space is economically beneficial to the developer as well as to the resident, nearby residents, and the local government. People's need for open space of various kinds has become more widely recognized. Open areas are valuable for recreation, separation of incompatible land uses, separation of communities, flood control, absorbing air pollutants, screening unattractive views, noise control, providing plants that help the carbon dioxide and oxygen cycles, and providing wildlife refuges as well as the great value to people's mental health.

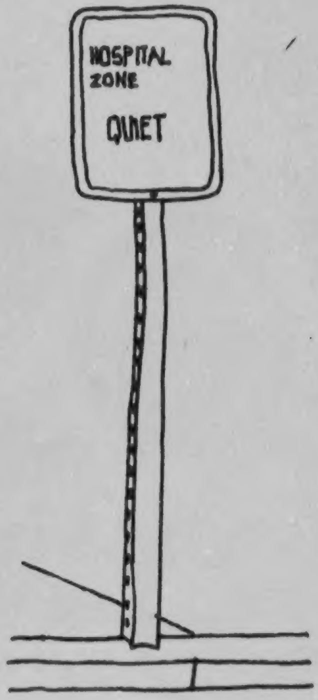
---

*5th Annual Report of the Council on Environmental Quality, Office of the President. December, 1974. p. 61,62. Available from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. $5.20. Stock No. 4000-00327.

> With increasing awareness of the importance of energy efficiency and energy conservation, planning and zoning assume an even more important role--in locating closer together housing, jobs, stores, and other commercial buildings, recreation, and other good things in life.

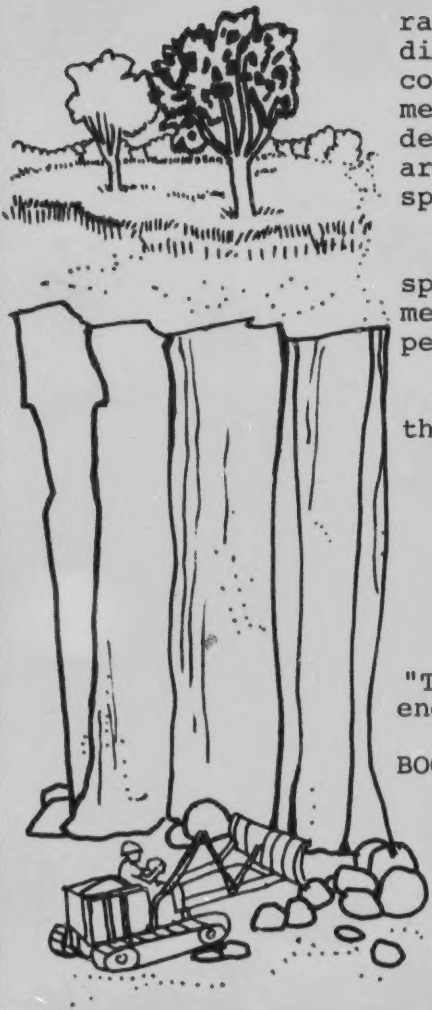
Zoning

Zoning is a tool for municipalities and counties to carry out land use policy. Under zoning regulations, the entire community is divided into categories (zones) where only certain uses of land are permitted. Many counties do not yet have zoning ordinances. Zoning regulations may specify small details such as lot size requirements, height requirements, regulation of any structure or activity within any parcel of land. The county zones only unincorporated land.



Often the zoning reflects what is already there. At times it may reflect what the property owner or neighbors want it to be. However, increasingly, zoning is moving toward what use the community wants for the land, with thought given to tax revenue and other benefits to the community. Reflecting concern for aesthetics, health , safety, and protection of property investments, zoning has frequently been a barrier against unwanted development.. Whatever the reasons for zoning, it has an important effect on land use.

"Cluster zoning" is a concept which is gaining in acceptance. Under this zoning, townhouses, single family units, tall condominiums can be arranged close together with plazas, trees, and walking areas while the rest of the tract is left in meadows or woods. This can be more attractive than the traditional one house to a lot, is less expensive for the builder, and offers more privacy from streets and cars.



"Planned unit development", (PUD), is another rather new concept. This can be done by special ordinance of the village or county which may override conventional zoning provisions. A particular development is considered as an individual case. This might defeat the purposes of regular zoning except that there are safeguards: public hearings are required and a specific site plan must be adopted.

According to some people, a combination of open space with cluster zoning and/or planned unit development makes a more livable environment over a long period.

Ideally planning precedes zoning. In practice, this procedure may not be followed.

> As logical as planning and zoning may seem, they are often made on the basis of private ownership and market value. Is some clearer mechanism needed for considering environmental and social values?

"Things to Do" for this subject are to be found at the end of the next chapter "More about Land Use."

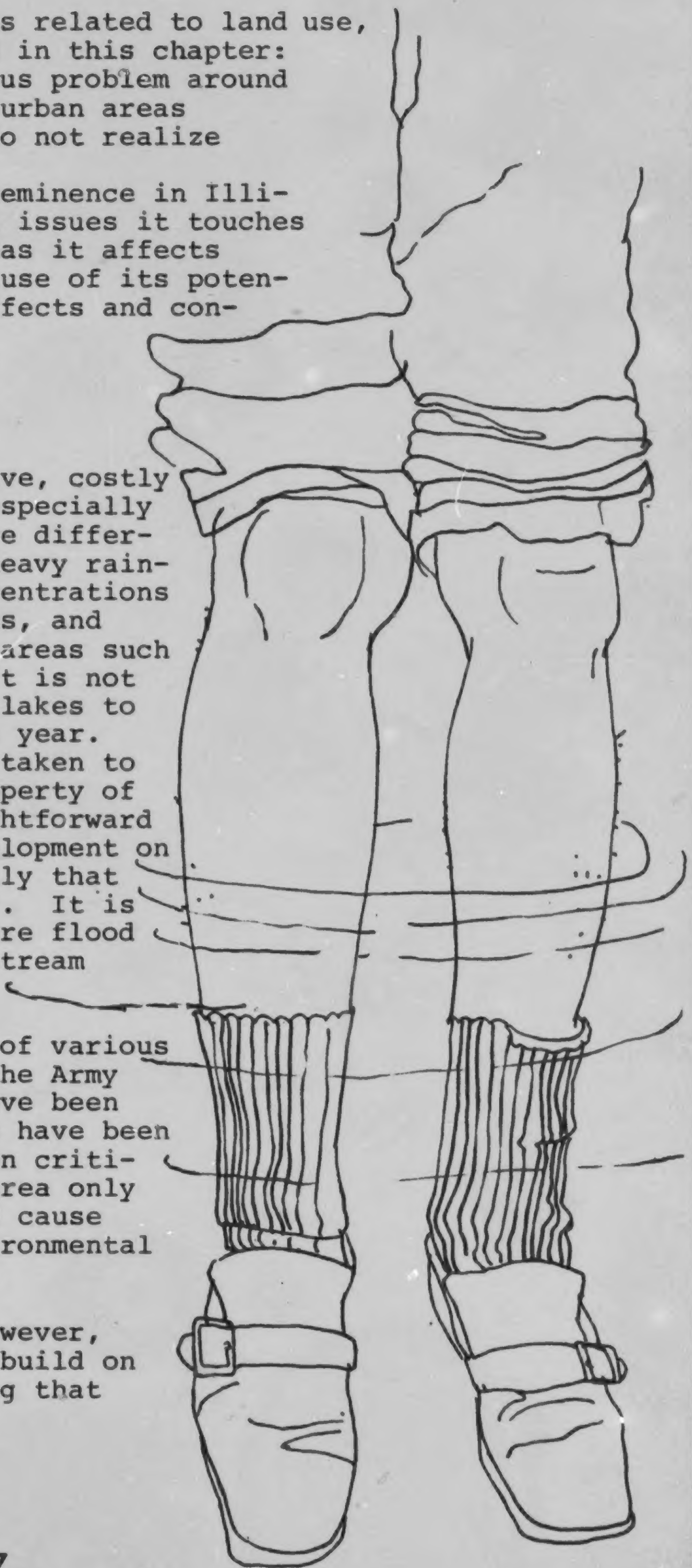
BOOKS TO ENJOY:

These publications were prepared for the Council on Environmental Quality. Order from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402.
The Costs of Sprawl. April, 1974. Literature Review and Bibliography. No. 4111-00022. $3.25.
Executive Summary. No. 4111-00023. 55¢.
Detailed Cost Analysis. No. 4111-00021. $2.90.
The Quiet Revolution in Land Use Control by Fred Bosselman and David Callies. 1971. No. 4111-0006. $2.75.
The Taking Issue. An Analysis of the Constitutional Limits of Land Use Control by Fred Bosselman, David Callies, John Banta. No. 4111-00017. $3.00.
Coal Gasification in Illinois: Problems for the People. A look at issues that the State, the coal industry, and the utilities aren't talking about. By the Illinois South Project, 412 S. Division, Carterville 62918. 75¢.

More about Land Use

Of the many environmental issues related to land use, the following will be discussed in this chapter:

- flooding--because it is a serious problem around the state, in rural as well as urban areas
- wetlands--because many people do not realize their importance
- agriculture--because of its preeminence in Illinois and the many environmental issues it touches
- mining--because of the vast areas it affects
- the corn-coal controversy--because of its potential for far-reaching future effects and considerable controversy
- a few other specific concerns.



Flooding

Flooding is a vexing, destructive, costly problem in many parts of Illinois, especially in many of the flat areas. There are different kinds of flooding: over-bank, heavy rainfall causing short-lived, large concentrations of water and often flooding basements, and flooding in low natural or man-made areas such as ponds or railroad underpasses. It is not unusual for some streams or shallow lakes to overflow their banks at least once a year. Flood experts say that steps can be taken to minimize the damaging effects on property of over-bank flooding. The most straightforward and effective way is to prevent development on flood plains. Some experts say flatly that the flood plain belongs to the river. It is a retention basin nature uses to store flood water until the water level of the stream recedes.

In some areas retention basins of various kinds have been built primarily by the Army Corps of Engineers. Also streams have been channelized (straightened), and dams have been constructed. Channelization has been criticized for solving a problem in one area only to carry away water more quickly and cause problems downstream. Dams have environmental effects which some people object to.

Flood plain land is cheaper, however, and developers are happy to buy and build on it. Some municipalities, recognizing that such development may well lead to trouble, have passed flood plain ordinances or have bought up flood plain land for recreational open space.

In urban areas some governmental bodies have decided that tearing down existing flood plain developments is less costly than repairing flood damages to homes or building levees, dikes, and other flood prevention structures.

Why has flood damage increased as development occurs? The more land that is paved and covered with roads and buildings, the less land is available to act as a natural sponge to slow down the pace of water runoff and drainage. Think of the surfaces in commercial or housing developments--roofs, blacktop and cement driveways, sidewalks, and parking lots--that replace former farmland. These surfaces cause runoff of water, perhaps into storm sewers, eventually to streams and finally to the Mississippi River and Gulf of Mexico rather than onto soil and ponds and marshes where the rain is a resource which maintains the ground water level. During flash rains and heavy storms, in places where drainage is inadequate, water which cannot run off gets into basements. With greater public recognition of the relationship of development and flood damage, of development and water for the community, people may begin to look for better ways to plan the development of their communities. Multi-storeyed buildings with open space preserved around them may be a better alternative than lowrise buildings which cover up more of the land and cause more runoff of rainwater and possible flooding. What other alternatives might there be?

In some areas where flooding is particularly acute, there may have been a considerable development over a short time. If you check into such a situation, you may find poor land use planning, and inadequate storm sewers and water retention areas. Who or what local governmental unit approved the development? This may be a subject you want to investigate.

Where the control of flooding requires regional cooperation, the multiplicity of local jurisdictions (mentioned in detail in "Who Makes Environmental Decisions" chapter) complicates solutions.

Erosion and sediment losses have increased in Illinois during the past several years in agricultural areas as well as urban areas.

- Is excessive erosion occurring in your area?
- Is some of this loss due to flooding?
- If this is from agricultural land, what are some possible causes?
- What land management/conservation practices might help cut down such losses?
- What might this loss cost in dollars as well as in future food production?

If the flooding and sediment losses have resulted from good agricultural land being covered by houses, factories, and roads and causing flash floods and other drainage problems, what might the alternatives be?

soil erosion

Wetlands

Are more people coming to understand the importance of wetlands of various kinds (lowland areas saturated with moisture, such as marshes) as aquifer recharge areas? Aquifers are underground water-bearing rock formations to which wells are sunk. The water stored there needs to be continually replaced because both urban and rural areas depend on them for vital water supplies. Replenishment of these underground reservoirs occurs in several ways:

- percolation through the bottom of creeks and rivers--which is slowed or stopped when layers of silt accumulate
- percolation through the flood plains of streams
- downward seepage of standing water in marshes and swamps.

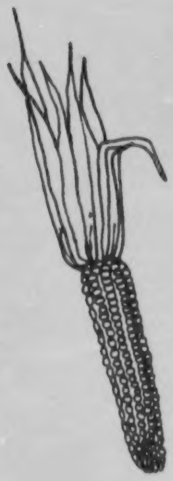
Streams choked with silt, filled-in marshes, flood plains that are built on, channelization of rivers that results in rainwater being carried away quickly--all of these prevent or decrease recharge of the aquifers.

How can you help more people understand the importance of wetlands?

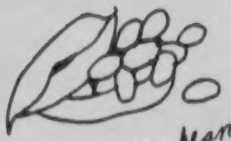
Agriculture

Illinois has some of the finest agricultural land in the world. Its soils are one of the state's most vital natural resources and economic assets. Farms cover about four-fifths of the state and average 254 acres in size.* There are about 111,220 farms in the state.* Only 200 of these are larger than 1,000 acres.* The small farms use modest amounts of re-

*1973 Illinois Agricultural Statistics Annual Farm Census sources while the huge farms, as one would expect, use vast amounts of fuel, equipment, and fertilizer. Huge corporations that own large farms have come to be designated by the term agribusiness. They may control all stages of production and distribution of a product from seed to the supermarket. Such farming may be efficient. What disadvantages might they have? Some concern is expressed about their lack of attachment to the land.



Much agricultural land in Illinois is in danger of being lost to agricultural production due to pressure from expanding urban areas. Legislation to establish agricultural conservation and protection areas was introduced into the Illinois State Legislature in Spring, 1975. This legislation sought to protect agricultural land and would apply an agricultural value assessment to the land for taxation purposes. While the legislation was not passed, it will be reintroduced in the next session. Watch for it in the newspapers or contact your State Senator or State Representatives about it.



soy beans

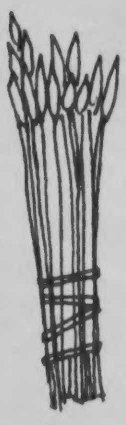
Corn and soy beans are the most important crops. Corn has been a chief crop since pioneer days. Soy beans is the top export crop of the state. Illinois ranks first in soy bean production and second in corn production in the nation. Hay, wheat, apples, peaches, hogs, and cattle are other important agricultural products.

As with other aspects of our environment, there are problems in agriculture--both affecting the farms and caused by them. Farms for instance, may be affected by air pollution, damaging crops and resulting in lower plant quality and lower yields.

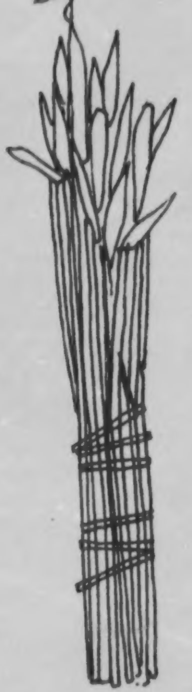
Heavy farm dependence on machines also means a great dependence on fossil fuels (coal, oil) to run the machines. Consider the possible effects that increasing fuel prices and/or possible fuel shortages might have on food production and food prices.

In many areas farmers compete with investors and large industries for prime land. Land-use protection and tax adjustments, which are being tried, seem to be sorely needed to enable the farmer to afford to work his land.

There may be environmental problems caused by certain agricultural practices. For many years soil erosion has been a serious problem and it is increasing. Sedimentation is the greatest pollutant of water, with



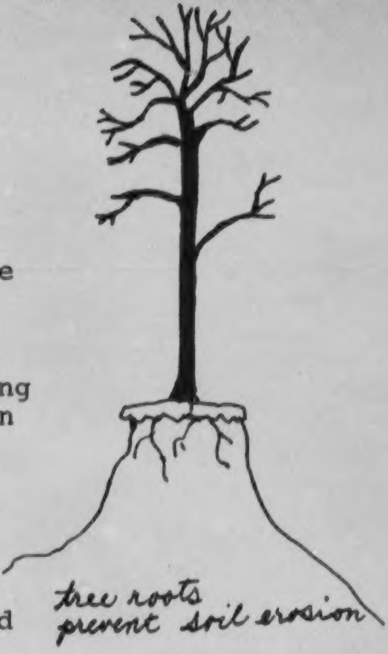
non-fertilized wheat



fertilized wheat

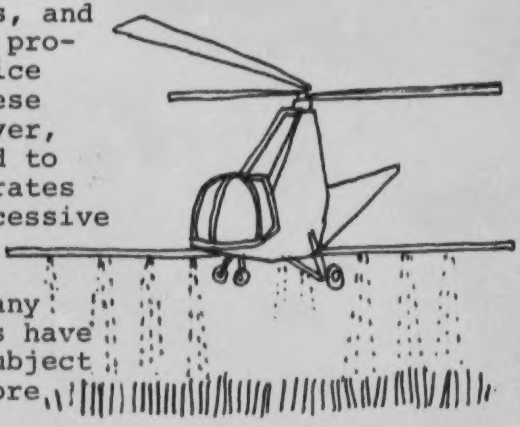
half the silt in the U.S. coming from agricultural land. Much can be done to control soil erosion, to keep the soil out of the waterways where it is a pollutant and on the land where it is a resource. Farmers are urged by the Social Conservation Service of the U.S. Department of Agriculture to use good land management and conservation practices such as:

- contour cultivation
- other erosion control measures
- winter cover for soil.
- conservation tillage
- zero tillage
- strip cropping
- crop rotation


tree roots prevent soil erosion

Feedlots, too, can have negative environmental effects. Americans' fondness for beef has caused farmers to increase the number of cattle raised in individual feedlots as well as the number of lots. Formerly, animal herds were relatively small and fed on pasture land. The manure produced was spread on the land. Nutrients from the manure were used by the growing crops, and organic matter from the manure became part of the soil. This practice is still done on Illinois farms which produce small numbers of cattle or hogs. But until recently the cost of chemical fertilizer has been low and farms with large feedlots have not used the great amount of wastes produced for fertilizer. Considerable work is being done on efficient waste treatment and disposal methods of feedlot wastes, and the State has passed Livestock Wastes Regulations. One of the main problems is water pollution from feedlots--both in runoff and groundwater contamination. In many areas there is also an increasing air pollution problem caused by feedlots in addition to the waste problem.

Our great agricultural production is due in part to heavy use of chemical fertilizers, pesticides, and herbicides. Because many of these products are produced from petroleum, they have increased in price and become harder to obtain. Used properly, these chemicals have benefitted people greatly. However, the overuse of fertilizers, for example, has led to some water quality problems. The runoff of nitrates from the fertilizers into streams has caused excessive growth of algae, decreasing water quality.



Pesticides have been beneficial, too, in many ways, but especially the long-lasting pesticides have had some serious environmental effects. This subject is complex and one that you may want to learn more about.

Many Illinois farms today are involved in monoculture, the production of a single cash crop. While

monoculture has increased production efficiency, it has reduced plant and wildlife diversity necessary to a stable ecosystem. These simpler ecosystems are more susceptible to attack by insect pests and diseases and are heavily dependent on chemical fertilizers and pesticides. This has also made the farmer more economically vulnerable.

It is obvious that a farmer's life is far from easy--affected as it is by wind, weather, the higher cost of land, supplies, and equipment, the high cost of food, clothing, and other products the farmer and his family need or want, the variable prices for crops, and so on. Have you ever wondered why anyone would want to be a farmer? Hillard Morris of Effingham County says it this way:

> "Why am I farming? My love for the soil and for natural resources. The challenge to work with and against nature and the opportunity to be of service to my fellow man for his dependence upon my ability to furnish him his food and resources for his survival. The farm is the backbone of the nation, and the survival of the world depends upon its ability to produce."

Morris is a farmer operating 750 acres of soy beans, corn, wheat, and hay, and a beef cow herd. His strong concern about conservation, the environment, and education are shown by his service to the community:

- 21 years as Director of the Effingham County Soil and Water Conservation District
- Past President of the Association of Illinois Soil and Water Conservation Districts, serving 7 years as President
- presently Legislative Chairman and member of the Education Committee of this Association
- member of the National Association of Conservation Districts Education Committee
- member for 12 years of Altamont Unit 10 School Board
- volunteer with local schools in their Conservation/Environmental program
- member of State task force which developed Illinois' Master Plan for Environmental Education.

For the sake of the earth, which has been misused in many ways, more farmers like Morris are needed who understand and respect the land, are conservators of the land rather than "users", and who help others develop a strong ecological or environmental conscience.

Mining

Do you think of Illinois as a mining state? Actually, Illinois has the largest bituminous (soft) coal reserves in the U.S. and ranks 4th in U.S. coal production. More than two-thirds of the state is underlaid by coal formations, about 40 percent of the state by coal close enough to the surface (within 150 feet) for strip or open-pit mining. (In strip mining the top soil is removed, the coal exposed, and then stripped away by huge machines.)

Petroleum is also found in Illinois. It is a fluid that is found in some sedimentary rocks. The major petroleum area is the south central and the southeastern parts with significant areas in central and western Illinois as well.

Other Illinois minerals include:

- limestone and dolomite (a kind of limestone)
- fluorspar*
- silica sand
- gravel and sand
- lead
- zinc
- clay
- ground water (see below)

Perhaps you have not thought of ground water as a mineral, but it is. Ground water is water that fills all openings in earth materials in that part of the earth which is permanently saturated, the top of which is the water table. The source of ground water is rain and snow that seeps into the soil and percolates downward. Below the water table, ground water moves toward places where it comes out as springs, or into lakes, rivers, marshes, and wells. Rocks that have fairly large openings between grains, such as sand, gravel, and sandstone or have interconnected cracks such as limestones contain ground water which can be obtained by wells. Such rocks are called aquifers. In Illinois sand and gravel beds are widely used as ground water sources. With increasing water consumption in many areas, the water table is dropping and many municipalities are or will be finding it difficult to provide water for their communities.

Mining operations not only produce resources important to our economy and to our society but in many places have caused environmental problems, some of them serious. Deep mining may result in subsidence, or settling, of undermined land. Strip mining of coal has often left scarred, unproductive land with high soil acidity and resultant widespread water

Find out what reclamation is now required in Illinois after coal is strip mined. Investigate the reclamation requirements in Germany and England.

*Illinois is the largest producer of this mineral.

pollution. Economic and environmental considerations frequently seem to be in conflict.

The Corn-Coal Controversy or Agricultural Land vs. Strip-Mining

It was planned to include a section here on the apparent conflict between land for agriculture and land for strip-mining. However, when research revealed the tremendous complexity of this topic, it was decided that it was not appropriate for this *Sampler*.

There are several vital issues here:
1) reclamation of land strip-mined before the 1962 Illinois law;
2) possible conflict between land some people believe should be kept in agricultural production and others want to strip-mine and reclaim. Our society must have food. Our society relies heavily on coal. Some people earn their living as farmers; others are miners. Can strip-mined land be restored to its former productivity? What alternative actions are possible? What tradeoffs might be made?
3) related subjects such as coal gasification. Coal gasification is a process whereby coal is heated to drive off burnable gas. The gas is purified and piped to wherever it is needed in the same way that natural gas is piped now. The gasification process can greatly affect environmental quality.

You may want to search for answers to such questions as:

- What are the over-all social and economic impacts of a certain course of action?
- Who will benefit? Who will pay?
- What are the short-term benefits and long-term considerations? How are they balanced?
- With strip-mining, who determines for what use to reclaim the land?

You may want to contact your State Senator or one of your State Representatives for information. Most references are quite technical, but several were located which may be of interest to laymen.

References:

Available from the Department of Mines and Minerals, Division of Land Reclamation, 400 S. Spring, Springfield Illinois 62707:
Surface-Mined Land Conservation and Reclamation Act 1970

as amended by House Bill 1277 and the 78th General Assembly.

Effective July 1, 1975.

Rules and Regulations pertaining to the Surface-Mined Land Conservation and Reclamation Act

Chicago Tribune. June 8, 1975, Section 2. Articles on:

- Strip Mining Bill Lode of Confusion
- Skillful Lobbyists undermine the (Strip-Mining) Bill
- Illinois Needs Bill to Reclaim Scarred Land

The Gasification of Coal. Harry Perry. Scientific American. 230 (3): 19-25. March, 1974.

The Illinois South Project. Coal Gasification in Illinois: Problems for the People. A look at issues that the State, the coal industry, and the utilities aren't talking about. Fall, 1974. Order from: The Illinois South Project, 412 S. Division, Carterville, Illinois 62918. 75¢.

SOMETHING TO WATCH FOR:

The Illinois South Project has received a federal grant to develop educational materials on this dilemma between energy development and agricultural production. These materials will include information on the issues, the ecological concepts involved, a teacher's guide, and a set of slides.

A few specific concerns

Several uses of land that have been of concern in urban, suburban, and rural areas include:

1) location of new power plants--In the last few years there has been increasing public controversy over such locations. There is a real dilemma: people want energy but do not want power plants located near them. Some of the objections concern safety. Others are aesthetic, e.g., have you seen the huge power lines which are appearing increasingly on the landscape?

2) solid wastes--Getting rid of our ever-increasing solid wastes is a land use problem. Open dumps, formerly common, are infrequently used today because of health hazards, visual pollution, and because they are no longer legal. Instead, sanitary landfills are now used. There, garbage and trash are buried under daily covers of soil. The filled-in area can be converted to a recreational use. It is increasingly difficult to find land for landfills that is

close enough to the source (city and industrial) so that garbage and trash can be economically transported. It must also be in a location where neighboring people will not find it objectionable. Is this a problem in your area? What possible solutions can you suggest? (Also see chapters on "All that Garbage and Trash" and "Wastes as Resources".)

PARK
Super-Duper
Parking Lot Acres
and acres and acres

3) paved land--Have you thought about the vast areas of land that are paved for use as roads, parking lots, airports, highways and interchanges, and school grounds? The paving may cover land which used to be productive farmland or a woods or perhaps a marsh and may have resulted in extensive destruction of trees, other plants, and water areas. What is there now? What might be done so that less land is covered? Consider:

- use of multi-level buildings rather than one or two-storeyed buildings
- better mass transportation to cut down the use of the auto and resultant "need" for more highways and parking lots
- retention areas to handle runoff water from large parking lots. They hold the water until it can sink slowly into the ground rather than run off.
- other solutions?

As air pollution standards have become more stringent, attempts to limit automobile use are being made, especially in the center of cities. You may want to look for a unique book--Streets for People: A Primer for Americans by Bernard Rudofsky (see Books To Enjoy at the end of this chapter.)

It is hoped that the information and ideas presented here will arouse your curiosity so that you will try to learn more about this fascinating, sometimes controversial, often discouraging, but certainly vast and vitally important subject of land use.

Do You Know?

From the days of early settlements in Illinois questionable decisions have been made on land use. Did you know that the first state capital, Kaskaskia, was periodically flooded and had to be abandoned? Kaskaskia was built in 1702 as a mission and became an important French settlement. In 1809 it became the capital of the Illinois Territory and from 1818-1820 served as the capital of the new State of Illinois. But its location was unfortunate. Finally the capital was moved to

Vandalia in 1820. Actually, the river's main channel shifted and by 1910 flowed over the site where Kaskaskia had been.

Fort de Chartres, half way between Kaskaskia and Cahokia, had a similar fate. Built in 1709, it suffered flood damage and had to be rebuilt in 1719, 1732, and finally in 1757. However, as might have been anticipated, floods continued and in 1772 the British abandoned the fort.

Why did this happen? Could it be that the flood plain belongs to the river and that the wise decision would have been to build on higher land?

In 1974 the Illinois Land Use Committee was formed to "spotlight land use issues". Organizations participating in this committee are:

American Institute of Architects
American Institute of Planners
American Society of Civil Engineers
Council on Population and Environment
Lake Michigan Federation
Landmarks Preservation Council
League of Women Voters of Illinois
Metropolitan Housing and Planning Council
Natural Areas Coalition
Open Lands Project
Sierra Club

Among the projects of this Committee are the publication of a bimonthly newsletter, the compiling of legislative files, and the scheduling of conferences. Further information may be obtained from:

The Illinois Land Use Committee
c/o Metropolitan Housing and Planning Council
53 W. Jackson
Chicago, Illinois 60604   (312) 922-5616

THINGS TO DO:

General

- Learn more about the geological history of Illinois.
- Consider and perhaps discuss how long it took for the natural resources of Illinois to be formed; the changes people from the early settlers to the

present have made in a relatively short period of time.

- Learn about the attitude toward land in other societies, past and present.
- Learn about Frederick Jackson Turner's thesis on the significance of the frontier in American history on shaping the attitude toward land in our country.
- Teachers, youth group leaders, and interested laymen might want to obtain material and information from the State Geological Survey, Urbana 61801:
  - booklets for use of Illinois teachers and students and a labeled collection of rocks and minerals for class use in Illinois schools
  - schedules of the geological science field trips conducted annually by the Geological Survey in various sections of the state for teachers and interested laymen.

- Contact the Geological Survey about the illustrated lectures given to organized groups about the geology and mineral resources of the state.
- Learn about the soils in your area by contacting the Soil Conservation Service of the U.S. Department of Agriculture and the Soil and Water Districts of the Illinois Department of Agriculture (consult your phone book).
- Learn about the importance of marshes and other wetlands as water recharge areas and wildlife habitat.
- Think about and discuss the following as you get more into the subject of land use:
  - What is your basic attitude toward land?
  - Do you think of it as a possession or commodity or as a resource?
  - What is the attitude of decision makers and developers you may see? Is theirs primarily an economic approach to land? Do they consider that land owners have privileges with few or no obligations to the land and to the community?
  - Or are your attitudes and/or theirs somewhere in between?

Your Community

Historical

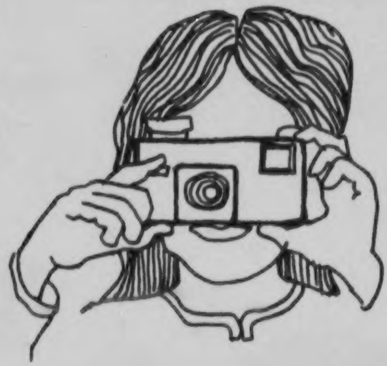
- Consider why your town is located where it is. Is there a natural land or water feature which influenced settlement? Was it located on an Indian trail or later along a railroad? You may want to investigate this at your public library or historical society.
- Students and others might interview older residents of the community about how the community

"looked" long ago, about social and economic changes (See section on Oral History in chapter on "History").

- Do research on how your community looked 25, 50, 100, 150 years ago. Contact your local or county historical society for help and share the results with them. Offer to lend your information to your library for a display.

Present-day

- Walk around your community and look for different land uses, perhaps using the categories listed in this chapter. What did you discover that you had not particularly noticed before? What services are for children? for adults? Do you think there are enough parks and other open spaces? If not, what can you do about it? Is your school site developed for good environmental studies? Is there a noisy business or factory close to where you live? Are stores or other commercial buildings easily accessible to where you live?
- Identify one or more good uses of land in your community; tell why you think it is "good".
- Identify one or more bad uses of land in your community; explain your choice.
- Make a photographic record of your community; include good and poor land uses.
- Try to locate aerial photographs of your area, going back to the oldest set of photos available.
- Investigate whether any group in your county holds an annual "airlift" or "air-tour" day, when you can fly over much of your county for a nominal payment.
- Consider the impact of the automobile on your area: ways the nearby and more distant environment have been affected; the amount of land set aside for the use of autos (include parking lots at factories and industrial parks, filling stations as well as roads, highways, and interchanges).
- Check into planning and zoning in your community:
    - Does your community have a plan for growth?
    - Do the planners seek technical information?
    - How is your neighborhood zoned? Your community?
    - If there is no plan in your community or county, why not?
    - Can you see how older areas, built before the days of planning and zoning, differ from newer areas? (Are there corner grocery stores? industry in residential areas?)
    - Attend local, county, or regional planning or zoning hearings; you may want to participate

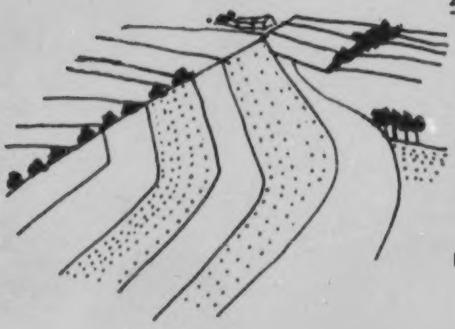


actively and present your (informed) views.

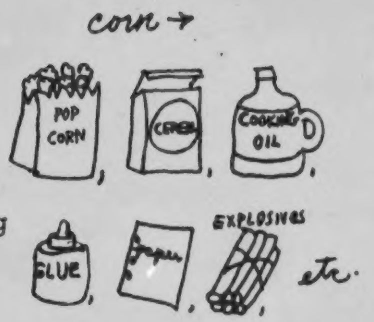
- If a change is being proposed, i.e., an addition to a parking lot, the widening of a street, or the dredging or filling of a pond or marsh, make a mini-impact statement (This is a good project for upper elementary and high school students.) Include:
  - a description of the proposed change
  - reasons for the change
  - construction-type activities that will be required
  - ways the physical environment will be affected (the water, air, soil)
  - living things in the area that will be affected and the ways they will be affected
  - ways people will be affected
  - weighing of the benefits and the costs to the environment
  - conclusions you have come to; possible alternatives to the project.
- Examine streams near you to see the effects of land use/land management on them:
  - Do you see streams that have been diverted or enclosed in culverts? Does this limit their drainage value?
  - Is there construction that stripped the land around streams of vegetation that regulated the flow of runoff water?
  - Do you see evidence of soil washing into the streams?

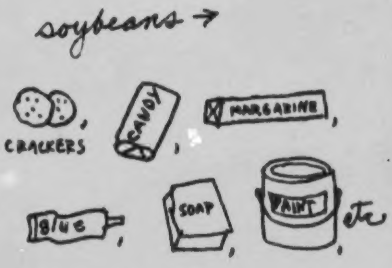
If you want to learn more about land use in your community or county, copies of zoning ordinances and town or county plans are generally available at public libraries. Or for a few dollars you can buy a personal copy.

Agricultural Lands



- Learn more about the good management and conservation practices of: contour cultivation, other erosion control measures, strip cropping, crop rotation, winter cover for soil.
- Find out more about the advantages and disadvantages of: one-crop agriculture (monoculture), chemical fertilizers and natural fertilizers, chemical pesticides and natural pest control.
- Talk to farmers about the crops they raise and the problems they have; how might the problems of farmers been different 25, 50, or more years ago?





- Learn about the work of the Soil Conservation Service of the U.S. Department of Agriculture and the Soil and Water Conservation Districts under the Illinois Department of Agriculture (check your phone book).
- Discuss the difference in attitudes of those making decisions for corporate farms compared to the small or medium-sized farmer; what might be the difference in feeling of commitment and responsibility to the community and to the land?
- Read about the "dust bowl", caused by poor farming practices.
- Learn about the many uses of corn and soy beans.

Mining

- Visit an area which was strip-mined years ago. Notice the vegetation. Try to determine the depth of the top soil.
- Write the Department of Mines and Minerals, Division of Land Reclamation, State Office Building, 400 S. Spring, Springfield 62706 for copies of:
    - Surface-Mined Land Conservation and Reclamation Act-1971 as amended by House Bill 1277 and the 78th General Assembly. Effective July 1, 1975. Rules and Regulations pertaining to the Surface-Mined Land Conservation and Reclamation Act.
- Write to the Forest Supervisor, Shawnee National Forest, Harrisburg 62946 to learn the present status of the Palzo Restoration Project on former strip-mined land (See section on Wastes from Water Treatment Plants in the chapter "Wastes as Resources".)

BOOKS TO ENJOY:

Clawson, Marion: Man and Land in the U.S., University of Nebraska Press, 1964. Adult.

Council on Environmental Quality, Office of the President. Annual Reports available from the Supt. of Documents, U.S. Government Printing Office, Washington, D.C. 20402 (quite readable for the layman; not technical)

Environmental Quality. The First Annual Report. August, 1970. No Stock Number. $1.75.

Environmental Quality. The Second Annual Report. August, 1971. Stock No. 4111-0005. $2.

Environmental Quality. The Third Annual Report. August, 1972. Stock No. 4111-0011. $2.

Environmental Quality. The Fourth Annual Report. September, 1973. Stock No. 4111-00020. $4.30.

Environmental Quality. The Fifth Annual Report. December, 1974. Stock No. 4000-00327. $5.20.

Illinois State Geological Survey, Urbana 61801. List of publications, January, 1974.

*Educational Series 1 - The Story of the Geological Making of Southern Illinois

- *1 - The Story of the Geological Making of Southern Illinois
- *2 - The Rock River Country of Northern Illinois
- *3 - Typical Rocks and Minerals in Illinois
- **4 - Guide for Beginning Fossil Hunters
- **5 - Guide to Rocks and Minerals of Illinois
- *6 - Field Book - Pennsylvanian Plant Fossils of Illinois
- *7 - Guide to the Geologic Map of Illinois
- **8 - Industrial Minerals and Metals of Illinois
- **9 - Inside Illinois - Mineral Resources
- *10 - History of Illinois Mineral Industries

*out of print; check your public library

**available from the State Geological Survey, Urbana 61801

Jacobs, Jane. *The Economy of Cities*. Random House, 1969. $5.95. Adult.

Little, Charles E. *Challenge of the Land*. Pergamon Press, 1969. Adult.

McClellan, Grant S. (editor). *Land Use in the U.S.* H.W. Wilson Co., 1971. Adult.

Platt, Rutherford H. *Open Land in Urban Illinois*. Northern Illinois University Press, 1971. $4. Adult.

Rudofsky, Bernard. *Streets for People: A Primer for Americans*. Doubleday, 1969. $5.95. Adult.

History of Illinois

Why include history in a Sampler on environmental study areas? History is included because people can understand present-day problems better and do more thoughtful planing of goals and priorities for the future if they know what has taken place in the past. They realize also that the impact of settlement of this area has occurred in 175 years or less.

SEAL OF THE STATE OF ILLINOIS
NATIONAL UNION
STATE SOVEREIGNTY
1868
1818
AUG. 26th 1818

When there was a land bridge from Siberia to Alaska and the area was open and free from glaciers, the ancient ancestors of the American Indian walked across the Bering Straits, probably between 25,000 and 8,000 B.C. According to archeologists, it seems likely that primitive man reached southern Illinois about the time the last glacier receded, some ten thousand years ago. His presence is found in a rock shelter near Modoc, in Randolph County. The foremost site of these early Indians and America's first large urban settlement north of the Rio Grande River was the city established at Cahokia Mounds, near St. Louis. This site supported a population of tens of thousands and included more than one hundred man-made mounds.

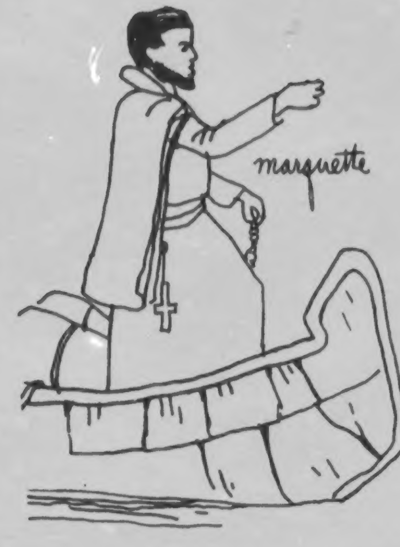
One of the most interesting records of prehistoric people was found in the excavation of the Dickson Mounds, now a state memorial near Lewiston, southwest of Peoria. There are more than 10,000 mounds raised by prehistoric people in Illinois, more than in any other state. Ninety percent of the mounds were probably used as burial places; the Cahokia Mounds were bases for official residences and temples.

At the Koster farm near Eldred, Illinois, forty-five miles north of St. Louis, a team from the Northwestern University Archeological Program is currently making history even as it is digging up history! Since 1969 seasonal digs have unearthed

This chapter was researched and written by Alaire B. Shields.

ruins of villages layered like a cake. The ruins go back to 6,500 B.C., with evidence of two more layers, or horizons, beneath them.

Evidence from these various sites indicates that a rudimentary agriculture was practiced which apparently did little to affect the "closed" natural energy circuits of the land. We can only speculate that the Indians must have been filled with wonder at the wealth of life in woodland and prairies. This evidence reveals that:



- corn, squash, and beans (called the Three Sisters), sunflowers, and tobacco were cultivated
- wild berries and fruits were eaten
- deer, ducks, geese, and swans were hunted
- tons of fish were netted in nearby lakes and streams
- bows and arrows with flint, chert, or quartz tips were used
- brine was made from various large salt springs
- beaver and deer hides were tanned for use as clothing and shelter
- decorative as well as ordinary pottery was made
- beads and earrings were made from both beaten copper and stone
- woven nets and baskets were common
- religious beliefs and ceremonial rituals were widespread, often involving the use of the peace pipe.

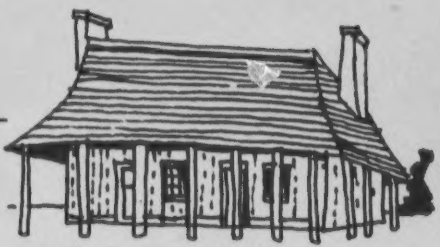
In 1534 the Frenchman Jacques Cartier began to explore North America. Over a period of years he explored the Gulf of St. Lawrence and as far west as present-day Montreal. In 1673, the first white men came through what is now northern, western, and part of central Illinois. They were Louis Jolliet, an explorer, and Father Jacques Marquette, a Jesuit missionary. They went on to explore the Mississippi River, and in seeking a more direct route north, followed the Illinois and Des Plaines Rivers, making a portage across land to what is now Chicago.

Perhaps during 1973 you saw TV and newspaper coverage of the re-enactment of the 300th anniversary of the Jolliet and Marquette journeys and the festive welcome the modern enactors received at many stops along their route as well as at the portage site, at Michigan Avenue and the Chicago River, and at the Lighthouse in Evanston.

The portage site was used a great deal by later travelers and settlers, and eventually a channel was dredged through it to connect the Illinois River with Lake Michigan. This historic site can be viewed in part at 47th and Harlem Avenue, in the Cook County Forest Preserve.

By 1700, in the search for a sea route to China and to establish trade, these early French explorers had mapped the huge, semi-circular area from the Gulf of the St. Lawrence through the Great Lakes, and on down the Mississippi River to the Gulf of Mexico. Outlining this vast crescent were a chain of fur-trading stations and forts which commanded large regions around them.

Important settlements or forts in Illinois included Cahokia, founded in 1699 and credited with being the oldest settlement in Illinois; the village which was to become the first capital of Illinois, Kaskaskia, 1703; Fort de Chartres, 1719; as well as the early forts established by Rene Robert Cavelier, Sieur de la Salle, Fort Crevecoeur on Lake Peoria, and a fort near the present site of Starved Rock.

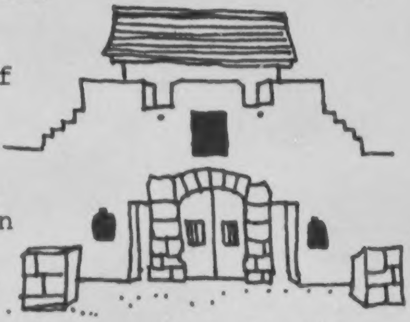


Cahokia Court House, restored. Built around 1737.

French settlements in Illinois country grew slowly. The small numbers managed to raise crops of grain which helped feed the whole Mississippi valley. French settlers were good-natured and easy-going. They accepted the Indians as equals, often marrying Indian women. Life centered around the Catholic mission. However, the French failed to develop the resources of the country.

British interests on this continent were heavy in the east coast settlements and advanced westward slowly. The first big wave of permanent settlers in Illinois were from these eastern colonies. Skirmishes involving Britain, France, and Spain more than once involved Illinois. French-controlled areas in the crescent were pressured by British settlements. The French and Indian War resulted, and the Illinois phase of this war was but part of a much larger struggle going on in Europe.

In 1763, the French ceded Illinois to the British, and Fort de Chartres, which had been the center of French influence in this area, was taken over by the British. The British as well as the French did not develop the resources of the Illinois country.



Gateway of Fort de Chartres restored

Few evidences of French influence remain in Illinois. British influence was felt, however, in

Indian affairs, social and economic institutions, political beliefs and institutions, and in the whole area of cultural affairs. For a little over a decade, the Illinois territory continued to be transferred from one jurisdiction to another. Then George Rogers Clark, first on behalf of the Colony of Virginia, then for the Revolutionary forces, defeated the British at Kaskaskia in 1778 and at Vincennes (Indiana) in 1779, securing Illinois for the United States.

A few years later an act was passed known as the Ordinance of 1787. This act provided the organization for a new unit of government to be known as the Northwest Territory, which included what are now Ohio, Indiana, Michigan, Wisconsin, and part of Minnesota as well as Illinois. It established the pattern for all future territories to proceed toward statehood in a regular and orderly manner and set the example for the expansion of the democratic way of life in all the territories. This Ordinance could rank along with the Declaration of Independence and the Constitution of the United States in importance when one considers its effect.

The period of territorial expansion ended in 1818 when Illinois came into the Union as the 22nd state. For another 15 years, a succession of treaties negotiated with the Indian tribes culminated with the treaty following the Blackhawk War, which evicted the Sauk and Fox from their ancestral lands in northwestern Illinois.

Indians occupied this country for thousands of years before the white man arrived. Their simple way of life changed little over the centuries. Their population was relatively small. They used many of the natural resources at hand for their survival: animals, plants, trees, rocks. They lived along the creeks above the floodplains; their paths often followed animal trails.

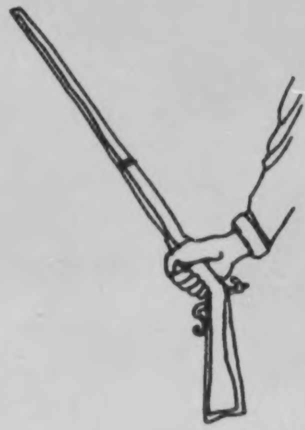
There was a great deal of movement of Indian tribes around what is now Illinois. Maps showing various tribes in certain areas might be accurate for a given time, but for a date a few years later different tribal locations would have to be shown. This movement was increased when the fierce and hostile Iroquois of New York and some of their eastern relatives gradually came farther and farther west on raiding parties. The Iroquois drove many tribes from their homes and further west. Tribes that occupied Illinois at one time or another included the Winnebago, Kickapoo, Piankashaw, Chippewa, Sauk and Fox (Sauk n' Fox), Ottawa, and Miami who were probably related to the Illini and Shawnee. The Potawatomi, who were latecomers into the northeastern part of Illinois, were prominent in the later pioneer history of Illinois. They spoke varieties of the Algonquin language which were understandable one to another, as dialects are.

The pioneers and later settlers had a quite different attitude toward the land from that of the Indians. They regarded living things and many other resources on this continent as inexhaustible riches. With the advent of rapid-fire guns and easily transported and repaired steel traps, they decimated species of wild animals and birds. They cleared the forests and plowed the prairies to make their fields. In some wooded portions, the settlers did not continue the yearly burnoffs and the woods became thick with underbrush and more difficult to clear.

As more and more settlers came, occupying more space formerly used by the Indians, the Indians became more belligerent. The Indians felt that land was to use and enjoy, perhaps to be defended against trespassers, but they did not believe that it could be owned exclusively by one person. They did not understand the "buying and selling" of land. When such a transaction occurred, the Indian might agree and even accept a sum of money or a gift. Later when the settler tried to enforce the bargain, conflicts arose. It was not simply that settlers were sharp bargainers (which they sometimes were), or that Indians reneged on their bargains (though it might seem so), it was probably that there was never a true meeting of minds because each had a totally different concept of ownership of land.

To get a real feeling for early American life and for the changes from the days of the pioneers in the wilderness to the settlers in towns and countryside, read the trilogy by Conrad Richter (published by Alfred Knopf)

The Trees	*1940*
The Fields	*1946*
The Town	*1950*

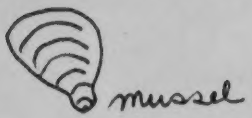


The early settler had to be independent and resourceful to survive, fighting his own battles with Indians, renegades, interlopers, and crooked salesmen. These attitudes carried over into all phases of social, economic, and political life.

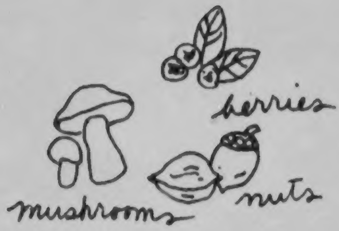
A BRIEF ACCOUNT OF PIONEER LIFE IN ILLINOIS

Pioneer life in Illinois was often a very hard struggle. People lived far from neighbors, work was hard, and the future was uncertain; a crop failure, for example, would be a major disaster.

The farmer grew wheat and corn, but he also

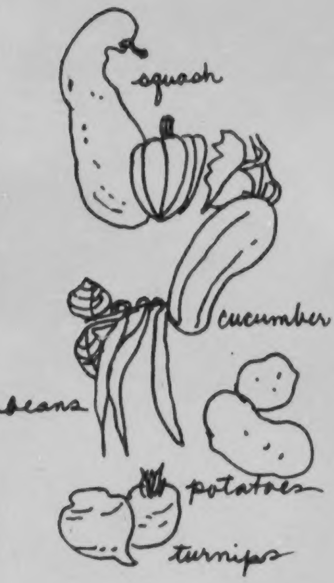


was a hunter: deer, bear, squirrels, and game birds such as ducks, geese, passenger pigeons, cranes, and prairie chickens were his prey. He fished in the rivers and creeks, and undoubtedly ate mussels and crayfish.



Berries, wild fruits, nuts, and mushrooms were gathered. Maple sugar and wild honey were used where sugar was expensive. Cornmeal mush and milk were eaten regularly. In good times, molasses might be added, and in bad times the milk might disappear from the table.

"Hogs and hominy", which was pork with Indian corn, was eaten often. "Corn pone" and "johnny cake" (corn bread containing bear grease or butter and flattened on a board) were forerunners of our pancakes and waffles.

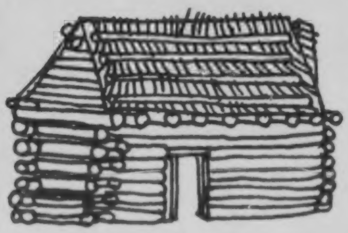


Most farmers had a vegetable garden, not only with squash and beans, but with potatoes, turnips, cucumbers and tomatoes. Corn and wheat were the basic crops. Corn was eaten in many ways, as well as fed to cattle and hogs. Most hogs lived on acorns and nuts (mast) found on the forest floor.

When a flour mill was built in a region, it was considered a real sign of progress. Salt was used to season foods and to preserve them. It was expensive and one of the important items sold in the early stores.

Beverages were water and tea made from herbs or sassafras. Real coffee was expensive, and many settlers made a kind of coffee from parched corn or wheat or even bread crumbs. Some settlers ran distilleries for "corn liquor" or made beer and wines. Settlers who came from New England or other northern areas liked a breakfast of beans and pie.

Early temporary homes of the pioneers were lean-tos, open on one side. The walls were built of logs, with mud used to make the structure more weather-tight. An open fire helped keep out the cold on the side without a wall, although skins were hung for added protection.



Within a year the settler began work on a more permanent home, a log cabin built with the help of neighbors. Completely enclosed, the cabin usually included a window, a door, and a chimney made of sticks and mud or rocks. Floors were dirt or puncheon, which were split logs laid with the flat side up. Cord grass was cut for roof thatching.

The earliest settlers came to northern Illinois country from New England, New York, and Pennsylvania. The southern part of Illinois was first populated by Virginians and those from more southerly coastal states. The settlers found almost half the state covered with forests, with the prairie running in great fingers between the creeks and other waterways. The pioneers clung to the wooded waterways, which afforded the simplest means of transportation.

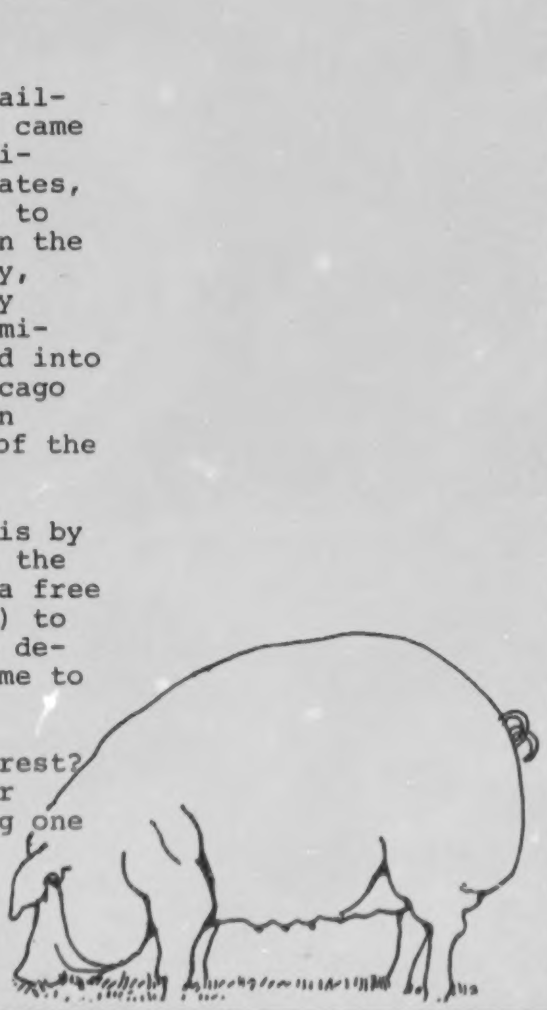
Later settlers sought the prairie land where crops could be planted when ground was broken, without the added back-breaking task of cutting the trees and clearing the stumps. In *Illinois as It Is*, Frederick Gerhard wrote "Hints to Immigrants":

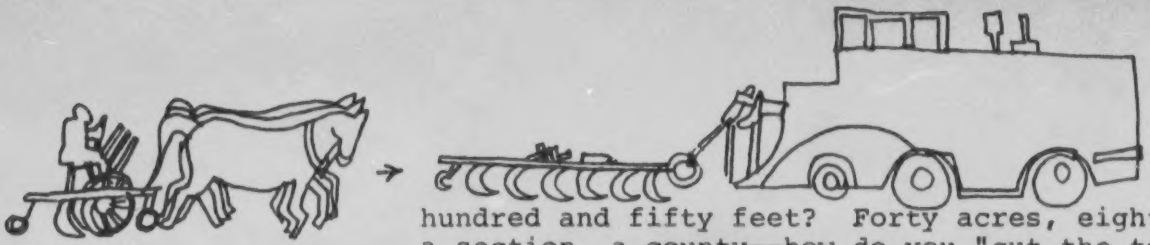
> "A pair of good horses, a wagon, a cow, a couple of pigs, several domestic fowl, two ploughs (one for breaking the prairie, and the other for tillage), together with a few tools and implements are all that is necessary for a beginning. A log house can soon be erected."

After the Erie (1825) and the Illinois-Michigan (1848) canals were opened, and the railroads and roads were begun (1850's), settlers came in larger and larger numbers. These were immigrants, not from other parts of the United States, but from outside the country. The Irish came to build canals and stayed on to farm and work in the factories. Other immigrants came from Germany, Great Britain, Scandinavia, and Canada. Early settlers came seeking land while the later immigrants also sought factory jobs. They crowded into cities. About the time of the Civil War, Chicago alone attracted 65 percent of the foreign-born residents of the state; the places of origin of the immigrants reads like the index of an atlas.

Some black people were brought to Illinois by slave-owning settlers in the southern part of the state. Illinois gained statehood in 1818 as a free state, and efforts to call a convention (1824) to amend the constitution to permit slavery were defeated. By 1870, free Blacks had begun to come to the state, chiefly to the cities.

> "How do you make a cornfield out of a forest? How do you make a town? How do you clear away trees five feet through and towering one





hundred and fifty feet? Forty acres, eighty, a section, a county--how do you "cut the top off" all the flat land between the Cumberlands and the Mississippi?" (from *Wild Plants in Flower (III) Deciduous Forest* by Torkel Korling and Robert O. Petty, p. 16.

From the prairie and woodland, the people of Illinois country have made fine farms, towns at the crossroads, the huge city of Chicago,... Changes of all kinds occurred here in the land we call Illinois. The small operations which made the steel plow, the farm machinery, and the railroad cars one at a time have grown to giant industries which mass-produce their products. Small colleges appeared around the state and increased in number. Some became great universities. Changes, of course, continue, often at a fast rate. (See also chapters on Transportation, Importance of Land Use, the sections of Open Spaces/Green Areas on Prairies, Cemeteries, and Forest Preserve/Conservation Districts, all of which include historical information.)

To help you understand some of the changes that have occurred in Illinois, the following chronological list of selected events is presented here:

1673	Explorers Father Jacques Marquette and Louis Jolliet go down the Mississippi, now the western boundary of Illinois; meet Kaskaskia Indians near Starved Rock; return by way of Illinois and DesPlaines Rivers; reach Lake Michigan over Chicago portage
1675	Marquette establishes mission near Starved Rock, first mission along the Illinois River
1679	Rene Robert Cavelier, Sieur de LaSalle crosses Illinois to Lake Peoria; builds Fort Crevecoeur on Lake Peoria; fort is abandoned in his absence. Father Louis Hennepin discovers first coal in North America on Illinois River
1682	LaSalle builds Fort St. Louis at Starved Rock; later claims Mississippi River for France
1690	Henry de Tonti, LaSalle's lieutenant, granted colonization rights in Illinois area; moves Fort St. Louis to Lake Peoria, 1691-92
1699	French mission founded at Cahokia, first permanent settlement in Illinois; becomes French center in Illinois country
1703	Jesuits establish mission at Kaskaskia
1717	Illinois country becomes part of French colony of Louisiana
1720	French build Fort de Chartres north of Kaskaskia; Illinois becomes district of French

Louisiana.

1731 Illinois area becomes Royal Province, governed by King of France; French fail to develop resources

1754 French and Indian War--American phase of war between Britain and France that is more accurately called the "Great War for the Empire" which was won by England

1763 France cedes to Great Britain her North American possessions east of the Mississippi (Treaty of Paris). Because of the resistance of Pontiac, chief of the Ottawas, England does not take possession of Fort de Chartres until 1765; England did not develop or promote resources because of conflict with rest of empire

1769 Chief Pontiac murdered by Illini at Cahokia; relaxed policy resulting in immigration from east coast and Virginia

1774 English instigate Indian attacks on frontier colonies

1776 Declaration of Independence

1778 George Rogers Clark captures Cahokia and Kaskaskia from the British

1780 Clark repels British attacks; Virginia claims Illinois as a county

1783 Illinois becomes part of territory ceded to United States by Britain by treaty which concludes the War of Independence

1784 Virginia cedes Illinois territory to national government

1787 Congress organizes Northwest Territory; includes Illinois country

1795 By Treaty of Greenville, Indians cede large areas to the white men including several tracts in Illinois(including the future site of Fort Dearborn)

1779 Jean Baptiste Point Du Sable, the first prominent Negro in Illinois history, establishes a trading post and farm on the Chicago River near Lake Michigan.

1800 Congress creates Indiana Territory which includes Illinois

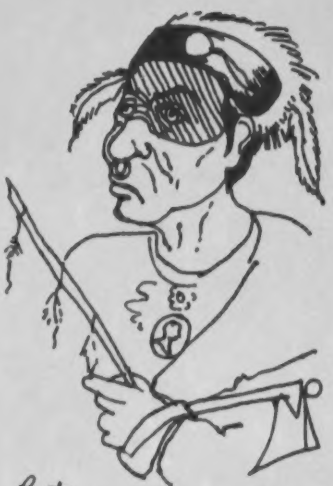
1803 Fort Dearborn established; built on south side of Chicago River at Wacker Drive

1810 Mail route established from Vincennes, Indiana, to St. Louis via Kaskaskia, Prairie du Rocher, and Cahokia

1811 First steamboat on Ohio and Mississippi Rivers docks at Shawneetown

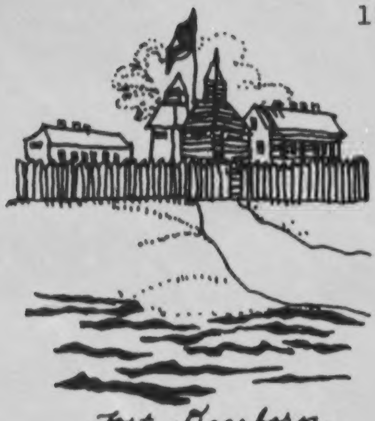
1812 Potawatomi Indians massacre troops at Fort Dearborn

1816 Fort Dearborn rebuilt, but never really



Potawatomi Chief Me-No-Quet as depicted in an old print.

needed as Indians in this area were peaceful by this time; torn down in 1836 to make room for Chicago


Fort Dearborn

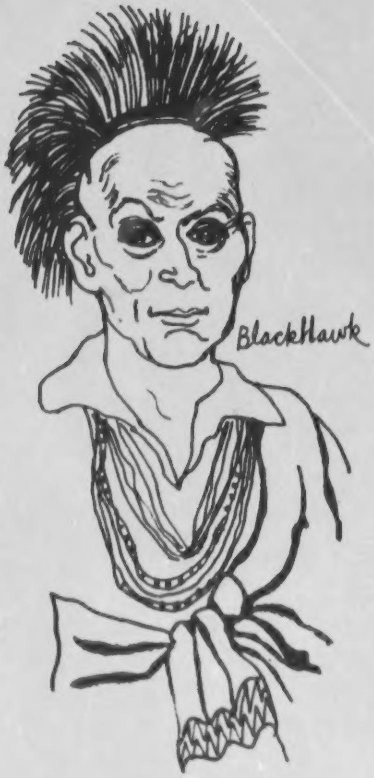
1818 Illinois becomes 22nd state of American union with present northern boundary instead of earlier proposed boundary which passed west through state from southern tip of Lake Michigan. (The reason for the boundary change was that if Mississippi and Ohio Rivers were the only outlets for Illinois trade, the interests of the state would become identified with southern states, but if outlet to Lake Michigan were provided, closer relations would be established with northern and middle states and "additional security for perpetuity of the Union would be afforded" (quote from enabling act of State of Illinois, 1818). Had it not been for the acceptance of the more northerly line, Chicago and the surrounding area would not be in Illinois.) Kaskaskia designated state capital

1820 State capital moved to Vandalia.

1823 Lead mines open in Galena

1824 People vote against calling convention to amend constitution to permit slavery

1825 Erie Canal opens in New York state; this along with invention of practical steamboat brought many people from east coast to Illinois


BlackHawk

1826 Rush to Galena lead mines begins; towns in northern Illinois experience growth, especially after removal of Indians further west in 1832, and opening of Illinois-Michigan Canal and railroad in 1848

1830 Lincoln family moves to Illinois

1832 Black Hawk invades Illinois; his defeat results in removal of Indians from Illinois to areas further west

1833 Chicago incorporated as a village

1836 Illinois-Michigan Canal begun

1837 Springfield chosen state capital

Chicago incorporated as a city

John Deere designs steel plow

Elijah P. Lovejoy, editor of abolitionist newspaper, the Alton Observer, killed by pro-slavery mob

State appropriates $10,000,000 for building of railroads

1838 First railroad operates in Illinois

1839 Mormons come to Nauvoo, which was largest town in Illinois within five years; Mormon War begins; leaders Joseph and Hiram Smith killed; war ends in 1846.

1845 Free education act passed

1846 Bishop Hill, Henry County, founded by a group of religious dissidents from Sweden who walked from Chicago, 160 miles away. They struggled and prospered and then disagreed and disbanded by the late 1860's, despite having been probably the most successful communal experiment in Illinois

1847 Cyrus McCormick, inventor of the reaper, opens factory in Chicago

1848 Second State Constitution adopted
Illinois-Michigan Canal opened

1848-70 Transition stage--Chicago developed from a town of 30,000 to a city of 300,000, probably the swiftest growth of a metropolis in history; many Illinoisans left for gold rush in California and the Yukon and to settle the fertile lands of Kansas and Nebraska. This was followed by another gold rush to Pike's Peak. In their places came "Yankees" from New England and others from other East Coast areas who settled in the northern part of Illinois. Settlers from the southern states came to southern Illinois. In 1849 there appeared in the Boston Post a poem which began:

> "Come leave the fields of childhood
> Worn out by long employ
> And travel west and settle
> In the State of Illinois."

1848 Galena and Chicago Union Railroad brings first freight into Chicago; rail services extended in 1852

1851 Northwestern University chartered; opens in Evanston in 1855

1853 First State Fair held

1856 Illinois Central Railroad opens

1857 Rail link between Chicago and the East completed

1858 Lincoln and Douglas engage in series of debates; Douglas wins election for U.S. Senator

1860 Republican National Convention in Chicago nominates Abraham Lincoln for President

1861 Civil War begins; Illinois furnishes 256,297 soldiers

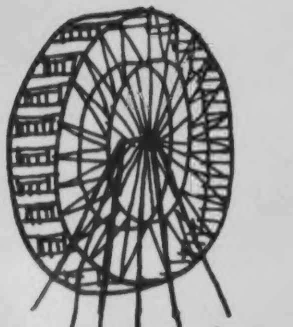
1865 Civil War ends; President Lincoln assassinated; Lincoln buried in Springfield

1867 University of Illinois founded at Urbana

1868 First river tunnel in the U.S. completed under the Chicago River

1869 Union Pacific Railroad links Chicago with West Coast

1870	Third State Constitution adopted
1871	Great Chicago fire burns large section of city
1872	Montgomery Ward & Company, pioneer mail order house, organized in Chicago
1876	Right of State to regulate business "clothed with a public interest" upheld by U.S. Supreme Court
1878	State Board of Health organized
1881	Aurora is first U.S. city with electric street lights
1884	Knights of Labor meeting (Chicago); demand for 8-hour day
1886	Strike of McCormick Harvester workers for 8-hour day leads to Haymarket Riot in Chicago
1889	Illinois State Historical Library founded. Jane Addams founds first settlement house
1891	Child Labor Act passed
1892	University of Chicago opens
1893	World's Columbian Exposition held in Chicago to commemorate 400th anniversary of discovery of America; Sears Roebuck and Company formed in Chicago
1894	Strike of workers in Pullman Car Company; American Railway Union calls general strike in sympathy; President Cleveland sends Federal troops to Chicago in defiance of governor
1895	38 railroads enter city of Chicago with about 2,600 miles of track within city limits; local travel by electric, steam, cable, and horse-drawn cars
1898	Spanish-American War.
1904	Theodore Roosevelt nominated for President at convention in Chicago
1906	State Highway Commission organized
1907	Hennepin Canal opened connecting the Illinois and Mississippi Rivers
1908	Republican National Convention nominates Taft at Coliseum in Chicago
1910	62 percent of Illinois is urban; Chicago houses half the population; half the population of Chicago, Joliet, and Rockford is foreign-born
1911	Workmen's Compensation Act passed
1917	Race riots in East St. Louis
1917-18	World War I; Illinois sends 210,000 men and women
1918	Illinois celebrates Centennial Construction of state-wide system of hard roads approved by voters
1919	Race riots in Chicago
1920	Harding nominated for President in Chicago by Republican National Convention



first ferris wheel - built for the Columbian Exposition

1922 Voters reject proposed new state constitution. At Herrin 22 killed in coal strikes

1923 Road bond issue of $100,000,000 authorized by General Assembly

Governor approves anti-Ku Klux Klan bill

1921 Children required to complete elementary grades before going to work; obligatory school year raised from six to eight months

1932 Franklin Delano Roosevelt nominated by Democratic National Convention in Chicago

1933 General Assembly enacts first general sales tax (2 percent); changed to 3 percent in 1935. Century of Progress exhibition opens in Chicago.

1936 General Assembly enacts laws providing old-age security, occupational disease compensation, and permanent voter registration

1937 Oil discovered in Marion County; petroleum industry booms in state

Eight-hour law for women passed

Ohio River rises in disastrous flood, leaving thousands homeless in Southern Illinois

1941-45 World War II; Illinois sends 900,000 men and women

1942 First atomic pile in history activated - secret project at the University of Chicago

1943 Chicago subway opened (extended 1951)

1950-53 Korean War

1952 Republican and Democratic party conventions held in Chicago; Adlai E. Stevenson, Governor of Illinois, unsuccessful Democratic candidate for President

1953 Illinois Toll Road Commission established to construct toll roads

1959 St. Lawrence Seaway opens; Chicago becomes a seaport

1961-73 Viet Nam War

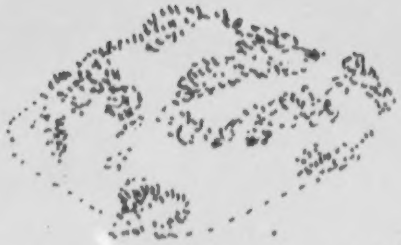
1970 Fourth State Constitution adopted

POPULATION OF ILLINOIS
from 1810-1970

1810	12,282	1900	4,821,550
1820	52,211	1910	5,638,591
1830	157,445	1920	6,485,250
1840	476,183	1930	7,630,654
1850	851,470	1940	7,897,241
1860	1,711,951	1950	8,712,176
1870	2,539,891	1960	10,081,158
1880	3,077,871	1970	11,113,976
1890	3,826,351		

THINGS TO DO:

- Decide what period in Illinois history interests you most. Find out more about it.
- Make a list of historical places you would like to visit (See yellow page).
- Visit an historical museum in your town, county, or elsewhere.
- Learn more about the early Indians by visiting Cahokia Mounds or Dixon Mounds. Write Illinois Department of Conservation, State Office Building, Springfield, Illinois 62706, for brochure, and/or visit the Koster dig at Kampsville--museum open daily June 1-November 1. Guide service. Schools, clubs, and organizations should make advance tour reservations by contacting Northwestern Archeological Project, 2000 Sheridan Road, Evanston Illinois 60201.



Monk's Mound, at Cahokia, covers 16 acres

- Get information on an excellent historical program for a school assembly or meeting for an organization by writing or phoning Reid Lewis (who portrayed Jolliet in the re-enactment of the 300th anniversary of the Jolliet and Marquette voyage) 17 S. Liberty Street, Elgin Illinois 60120, (312) 697-6580 or (312) 631-7446.

Learn more about the LaSalle: Expedition II by writing LaSalle: Expedition II, 135 South LaSalle Street, Room 411, Chicago, Illinois 60603, (312) 443-2103. Reid Lewis, who portrayed Jolliet in the Marquette-Jolliet re-enactment, is organizer and director of LaSalle: Expedition II. This project culminates in the actual expedition phase from August, 1976-April, 1977. The brochure explains that "LaSalle: Expedition II is much more than the authentic recreation of LaSalle's 1681-82 voyage. It is a total commitment by fifteen high school students, six educators, a playwright, and a priest to dramatize how important an understanding of the past is to the building of the future."

- Read some of the books on the list in this chapter; look for historical fiction in your public library.
- Learn about the Illinois Student Historical Program for students in grades 7-12. For free copies of writing requirements, contest rules,

meeting dates, and places, and/or history club packets, write to the School Services Department, Illinois State Historical Library, Old State Capitol, Springfield Illinois 62706.

▶ Using the Population chart of Illinois directly following the chronological list of events in Illinois history, consider the impact on the land of the increase in population that came in a relatively short period of time. Can you think of ways the land in Illinois can be used well so it will continue to be productive as well as a desirable place to live?

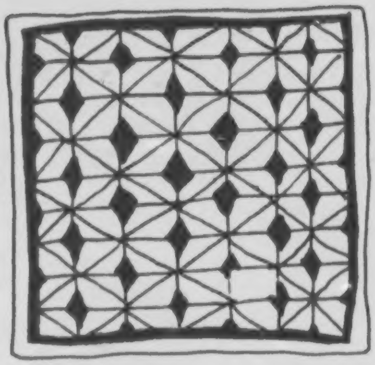
Have you heard about Living History, Oral History, and Environmental History? These are vivid new approaches to history which bring alive the people of earlier times. In the following pages these three approaches are explored.

Living History

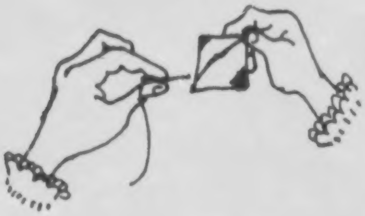
Across the nation enthusiasm has developed for bringing the past to life. People are looking carefully at the vanishing remnants of natural and social environments which shaped the lives of ordinary people and in turn were shaped by them. Preservation of historic structures and natural areas is not the only aim. More and more people are coming to see the importance of re-creating past environments so that the character of life styles and their implications for land and resource use can be grasped.

"Living history" is the phrase which is used to describe this movement. Used properly, the phrase refers to programs and institutions in which the past in its totality is discovered through serious research and then brought to life in what museum people call "interpretive programs." The aim is to show as accurately as possible a re-creation of a piece of a whole society in its appropriate natural and physical setting.

Formally these institutions are often called museums or natural areas. The word "museum" is a turn-off for many. Static collections of objects which cannot be touched or used and endless glass cases or neat and orderly "historic" buildings where there is no life spring to consciousness. "Living history" villages, farms and natural areas are, by contrast, full of life and of new learning experiences. Participation is often a key element in the programs. Processes are focused upon rather than objects. The visitor, whether tourist or school child, is brought to see the complex interrelationships of people and their environments. The values of people become apparent, reflected not only in their talk, but the ways in which they do their work in the kitchen, plow their fields, care for their gardens or handle their land.



Some living history settlements and farms have special intensive programs for school children. They go far beyond the typical walk-throughs or guided tours. Children are divided into small groups so that they can participate in re-creating the past. They may cook a meal over an open hearth, learn to split logs, make a quilt patch, or plant crops in an historic garden. They may play roles as members of a farm or urban family in order to discover what was involved in past life patterns and why things were done a certain way.



Naturally such programs can serve only a limited number. The institutions which offer them see the programs as models for people outside the immediate area and will give advice on how to start one. The Clayville Rural Life Center, twelve miles northwest of Springfield, Illinois, and owned by the Sangamon State University Foundation, is one such place. Its "Mornings at Clayville" program can only serve fifth graders in Sangamon County. However, the staff is glad to talk with people who want to do similar programs elsewhere and can supply some helpful written materials.

by Edward L. Hawes
Assistant Professor of History
Sangamon State University
Environments & People Program
Clayville Planner

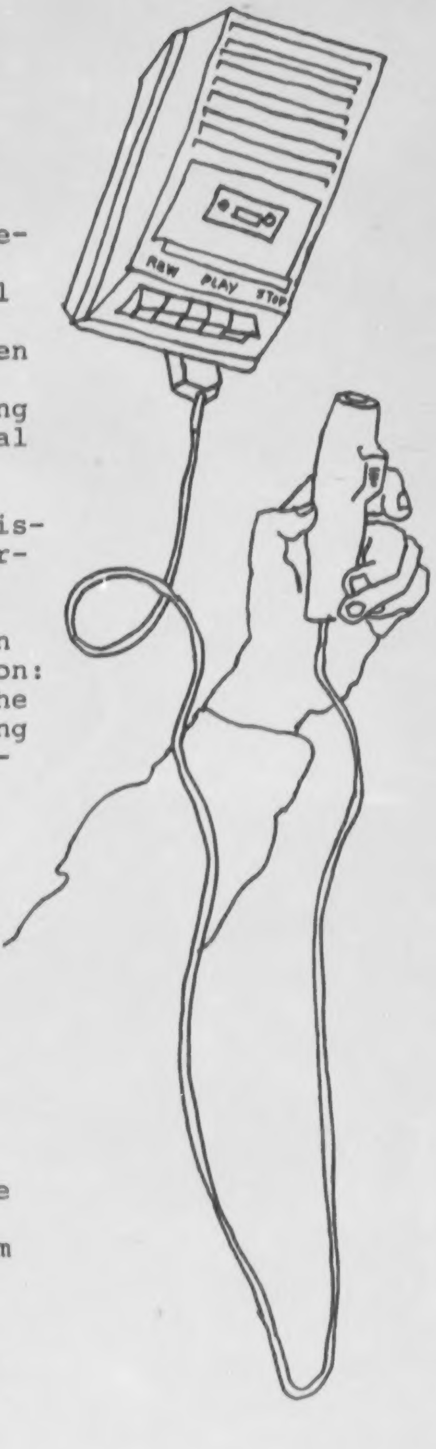
What Is Oral History?

"Oral history is an increasingly popular and effective technique used by both amateur and professional historians to gather data about the past through the systematic tape-recording of personal reminiscences. It is a method ideally suited to the history-minded citizen who wants to investigate his community's past, his family history, or some activity or event of particular personal interest.

Ways of life that were characteristic of an earlier America are rapidly disappearing, but many persons still alive today remember them vividly. Most people do not preserve their memories in written memoirs, but many are willing to tell their stories and confide their reminiscenses to the tape-recorder.

...oral history can serve as a vital link between the present and the immediate past. Taped reminiscences provide the historian with material rich with the kind of detail, insight, and personality that is so often missing from the written record.. Properly used, oral history can shape the ways in which we view "history" by re-focusing our attention on the role played by the individual human being in the historical process..."

from HISTORY WITH A TAPE RECORDER. An
Oral History Handbook from Oral History Office, Sangamon State University



The Handbook, from which the above quotation was taken, gives additional helpful information on:

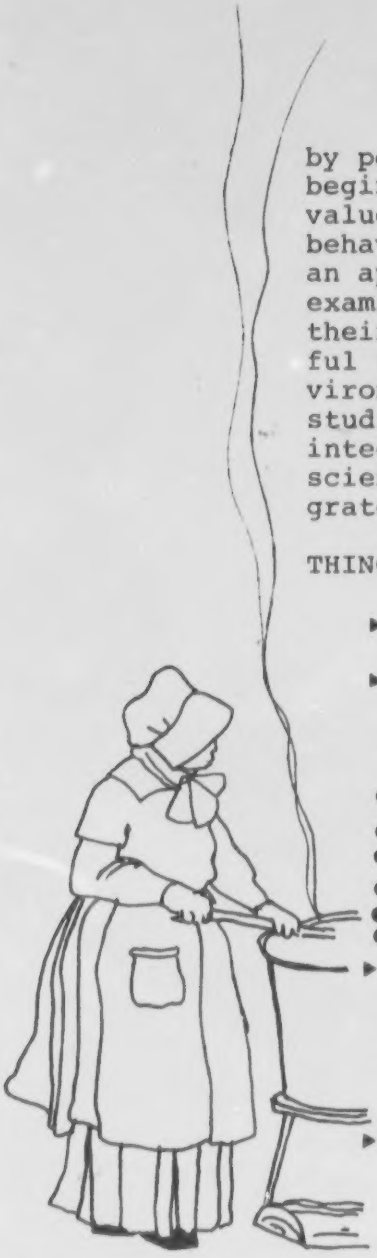
- Preliminaries to the Interview--selecting the narrator, planning the first interview, doing pre-interview research, preparing the interview outline, preparing your equipment
- Conducting the Interview
- After the Interview
- Books for further information.

If you would like a copy of the Handbook or have further questions, write or phone:

Oral History Office
K-34-H
Sangamon State University
Springfield, Illinois 62708
(217) 786-6656

Three outstanding examples of oral history are the Foxfire Book, Foxfire 2, and Foxfire 3 (See Bibliography). These books resulted from material gathered by high school students in the southern Appalachians. The material was first published in a magazine completely produced by the students. With tape-recorder and cameras, the students recorded hunting tales, ghost stories, how-to information (as how to build a log cabin, how to preserve vegetables and fruit...). This project came into being when a teacher, seeing that traditional teaching made his students bored and restless, looked for ways to actively involve the students in learning.

Now - Environmental History



To understand the environmental changes caused by people, "Environmental History" courses are beginning to appear. They examine the ideals, values, ambitions, and fears that influenced people's behavior toward the environment. The purpose of such an approach is to develop an ecological awareness by examining the historical relationship of people to their natural environment. This approach is helpful to educators who would like to incorporate environmental education into their teaching of social studies or humanities. It is especially valuable in integrating the study of the humanities, social sciences, and sciences just as they are actually integrated in everyday life.

THINGS TO DO:

- ▶ Visit living history sites or events in Illinois (See yellow page).
- ▶ If you and/or your family plan to travel to other parts of the U.S., you may want to include a visit to such well-known living history sites as:

●Sturbridge Village	Sturbridge, Massachusetts
●Old Williamsburg	Williamsburg, Virginia
●Farmers Museum	Cooperstown, New York
●Pioneer Village	Minden, Nebraska
●Mystic Seaport	Mystic, Connecticut
●Dearborn Village	near Detroit, Michigan

- ▶ Teachers may want to recognize the richness and diversity of their students' heritage by encouraging young people to share books, music, customs, and foods that may have been in their family a long time and are especially meaningful to them.
- ▶ Try recording oral history with a member of your family or community. Write or phone the Oral History Office, K-34-H, Sangamon State University, Springfield, Illinois 62708, (217) 786-6656, for the publication HISTORY WITH A TAPE RECORDER. An Oral History Handbook.
- ▶ Check programs of colleges near you for environmental history courses; if none is available, ask them to consider offering one.

BOOKS TO ENJOY:

Adams, Samuel Hopkins. The Erie Canal. Random House (Landmark Books), 1953. Intermediate grades-up.

Burton, William L. Illinois: A Student's History of the Prairie State. Panoramic Teaching Aids, Inc., 1969. Grade 5 - up.

Carpenter, Allan. Illinois. Land of Lincoln. Children's Press, 1968. Grade 5 - up.

Guillet, Edwin C. Pioneer Arts and Crafts. University of Toronto Press, 1973. $2.

Havighurst, Walter. The First Book of Pioneers. Watts, 1959. Grades 1-5.

Havighurst, Walter. Land of Promise. Macmillan, 1946. Adult.

Hoff, Rhoda. America-Adventures in Eyewitness History. Henry Z. Walck, 1962. Intermediate grades - up.

Horrell, C. William, et al. Land Between the Rivers. The Southern Illinois Country. Southern Illinois University Press, 1973. $18.95.

Howard, Robert P. Illinois. A History of the Prairie State. William B. Eerdmans Pub., Grand Rapids, Mich. 1972. Adult. $10.95.

Johnson, Gerald W. America Is Born. Morrow, 1959. Intermediate-adult.

Johnson, Gerald W. America Grows Up. Morrow, 1960. Intermediate-adult.

Johnson, Gerald W. America Moves Forward. Morrow, 1960. Intermediate-adult.

Luna, Charles. The Handbook of Transportation in America. Popular Library, 1971. Adult.

Miller, William S. Growing Up in Goose Lake. 1974. Published by and available from the Open Lands Project, 53 W. Jackson, Chicago Illinois 60604. $3.50.

Nathan, Adele. The First Continental Railroad. Random House (Landmark Books), 1951. Intermediate-up.

Nevins, Alan. Short History of the United States. Knopf, 1969. Adult.

Quimby, George. Indian Life in the Upper Great Lakes. University of Chicago Press, 1971. Adult. $2.45.

Ritzenthaler, Robert E. Woodland Indians of Western Great Lakes Area. Natural History Press, 1970. Adult. $1.95.

Rolvaag, Ole Edvart. Giants in the Earth. 1929. High school - up.

Schlebecker, John and Gale E. Peterson. Living Historical Farms Handbook. #4700-0185. 65¢. Order from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402

Sloane, Eric. A Museum of Early American Tools. Ballantine, 1973. $2.

Tunis, Edwin. Colonial Craftsmen. World, 1965. Intermediate-up.

Tunis, Edwin. Frontier Living. World, 1961. Intermediate-up.

Tunis, Edwin. Indians. World, 1959. Intermediate-up.

Wigginton, Eliot. (ed.) The Foxfire Book. Doubleday, 1972. High school-up. $3.95 paperback.

Wigginton, Eliot. (ed.) Foxfire 2. Anchor, 1973. High school-up. $4.50 paperback.

Wigginton, Eliot. (ed.) Foxfire 3. Anchor, 1975. High school-up. $10.

The many historical novels of Laura Ingalls Wilder have been enjoyed by countless individuals from age 9-up.

Though the title is misleading, the periodical Outdoor Illinois includes many articles on history and geography with maps and information on places and things to see and do.

$8.50/year for 10 issues. Write to Outdoor Illinois, 320 South Main Street, Benton, Illinois 62812.

the Capitol at Springfield

Living History

For a Calendar which includes living history events around the state, write:

Illinois Department of Conservation
State Office Building
Springfield, Illinois 62706

A few excerpts from the 1975 Calendar:

April thru October (3rd weekend of each month)	Living Village: New Salem State Park, Lincoln's New Salem, Illinois. Through contact with people dressed in historic costume, gain a better understanding of what it was like on the Illinois frontier in the 1830's.
May 3	Frontier Days: Pere Marquette State Park, Grafton, Illinois. Crafts demonstrations, edible wild foods, and nature tours.
June 7 & 8	Ft. de Chartres Rendezvous: Ft. de Chartres State Park, Prairie-du-Rocher, Illinois. Reviving the early French-frontier period with traditional Rendezvous activities of flintlock shooting, tomahawk throwing, militia demonstrations, birch-bark canoe races. Crafts and period music.
June 14 & 15	Spring Skills from the Hills: Galena, Illinois. Costumed volunteers demonstrate and explain common 19th century crafts.

Historical Sites

Information on historical sites is available from the Illinois Division of Tourism. Brochures available include:

- Alton River Country--Southern Illinois
- Blackhawk Hills Country in Northwest Illinois
- Champaign-Urbana-Danville--East Central Illinois
- Chicago Area--along the North Shore; Aurora and the Fox River; to Chain O'Lakes; Dundee; DuPage County; Evanston; Frank Lloyd Wright architecture in Oak Park and River Forest; Pullman Village and Frankfort on the Main
- East St. Louis Area
- Kaskaskia Island Area
- Northeastern Illinois
- Peoria Area--Region 4
- Rockford--Northwest

Rockford-Freeport Area--Northwest
Southwestern Illinois Expedition Land
Springfield
Springfield Area--Clayville-New Salem and Vicinity, Lincoln-Clinton-Decatur, Springfield
Tours of Scenic Western Illinois
Vandalia and Vicinity--Southern

To obtain these brochures, write to:

Illinois Division of Tourism
Department of Business/Economic Development
222 S. College Avenue
Springfield, Illinois 62706

A PARTIAL LIST OF LIVING HISTORY SITES

County	
Cook	Chicago Historical Society, 1629 N. Clark, Chicago 60614--exhibits and demonstrations of early crafts Sand Ridge Nature Center, on Paxton Avenue, 2 blocks north of 159th Street, South Holland--replica of a cabin and pioneer exhibits; demonstrations of early crafts some Sundays
Henry	Bishop Hill--restored village of Bishop Hill Colony, 1846-62, founded by a group of Swedish religious dissidents; colony produced linen, furniture, wagons, brooms, and farm products for sale; during the years 1848-62 it became a major center of commerce between Rock Island and Peoria
Menard	New Salem State Park, near Petersburg on Routes 97 and 123, about 17 miles northwest of Springfield--from end of April to end of October, a Living Village as it was on the Illinois frontier in the 1830's, with people in historic costume
Sangamon	Clayville Rural Life Center, Route 125, Pleasant Plains, about 12 miles northwest of Springfield--living folk art museum

Note:
- --Watch newspapers for dates of craft demonstrations and other activities reliving historical events near you.
- --See List of State Memorials in the Open Lands/Green Areas chapter.

That Valuable Asset, Lake Michigan

Lake Michigan is the largest freshwater lake entirely within the limits of the United States. It is over 300 miles long, almost 120 miles wide, and over 900 feet deep. The Lake itself covers over 22,000 square miles of land, and its watershed drains an area over twice that size in the states of Michigan, Indiana, Illinois, and Wisconsin. There are submerged ridges of rock and rock debris reaching from Milwaukee, Wisconsin, to Grand Haven, Michigan, which divide the lake into a northern and a southern section. These ridges keep the water in the two sections from mixing thoroughly.

Lake Michigan is the third largest of the Great Lakes and the fifth largest freshwater lake in the world.

The Great Lakes provide the largest surface fresh water reservoir in the world, except for the polar ice caps.

Almost half the time winds in the lake area blow from the west and northwest. Currents carry materials to the eastern and southern shores of the lake. This wave action has resulted in some of the finest dunes in the midsection of North America.

Four hundred million years ago warm seas covered the entire area of northeastern Illinois. The seas receded, and later, glaciers covered the land. By 9,000 B.C., the climate had become warm enough to melt the last glacier.

The Lake facilitated the early settlement of northern and central Illinois and states farther west. Before 1840 settlers began to come by way of the lake and continued down the rivers of the northeastern part of the state. Later, settlers who moved on to the West used this same route.

Lake Michigan has also had a tremendous effect on the development of Chicago as a great urban area. Through the Lake and the St. Lawrence Seaway, there is contact with the Atlantic Ocean; ocean-going vessels can come to the Port of Chicago for about eight months of the year. Automobiles, steel, grain, and earth-moving equipment are a few of the items exported. The connection of Lake Michigan with the other Great Lakes has resulted in unique navigation conditions and considerable lake commerce. In addition, the connection with the Illinois-Mississippi waterway has made possible movement of goods in both directions.

Lake Michigan is a valuable resource. Water is withdrawn from the lake for water supplies for many municipalities; for industrial, rural domestic and livestock, power generating, irrigation, and mining uses. The shores of the lake provided very important recreational space while its open waters are used for boating and sport fishing as well as commercial navigation.

BUT WHAT HAS BEEN THE EFFECT OF PEOPLE ON THIS VITAL RESOURCE? Here are extensive quotes from the excellent map--brochure by the Lake Michigan Federation, (see reference at end of chapter):

"The story of man's impact on Lake Michigan is a story of pollution and exploitation of a natural resource, resulting in acceleration of the aging process called eutrophication... Man's activities have increased the nutrient level far beyond what it would be naturally. Man's impact also includes bacterial pollution in the inshore waters and tributaries, and pollution from oil, chemicals, and waste heat.

"The changes caused by man in the lake's natural systems have resulted from poor planning and a failure to recognize and understand the complexities of the lake's ecosystem. The quality of environment around the lake will ultimately determine the life in the lake and its survival as a natural resource... Man's task is to learn how to use it, without destroying it.

"Effluents are waste materials, and use of Lake Michigan as a repository for wastes has changed its chemical composition. Agricultural runoff, industrial wastes and municipal sewage have put vast quantities of chemicals into the lake. Some are highly toxic, while long-term cumulative effects and interaction of others are not known.

"Waste heat is released into the lake by power plants. It is not yet known which organisms adapted to a cold water lake can tolerate increased temperatures, and what population changes will occur.

"The worry is that man may not be able to recognize all the consequences of effluents until it is too late to do anything about them. That is why some scientists and conservationists believe that the use of the lake as a waste sink should be stopped, even though definite damage cannot be attributed to some specific pollutants.

"Pesticides from agricultural areas run off the land into the soil and thence into streams to work their way up the food chain. Pesticides have become so concentrated in the fishes most valuable for human consumption that they are banned from interstate shipment. Heavy metals from industrial wastes such as mercury are not known to be a problem in Lake Michigan, but potentially could be.

"The dominant species of fish in Lake Michigan today are quite different from the original species. Overfishing and the inadvertent introduction of the non-native alewife and lamprey eel into lake waters through the Welland and Erie Canals has changed the numbers and types of fish found in the lake today. Recently new species have been deliberately introduced to replace some extinct species. While the new species are useful and valuable, the ecosystem has become more simple and less diverse than it was before.

"The lake trout, lake herring, whitefish and lake sturgeon no longer exist in commercially valuable numbers. Fishing and the changes in water quality and spawning grounds have made Lake Michigan suitable for less desirable, less valuable species such as alewives, smelt, perch, and carp... The introduction of the coho and chinook salmon represent man's attempt to restore the balance between predatory fish and forage fish. The salmon and lake trout being stocked as fingerlings each year eat alewives, grow rapidly, and provide sport fishing in the lake.

sturgeon

perch

"Man cannot predict the value of a species to himself or to the lake's life systems. Species have been lost whose value was high, but future alterations could prove even worse. The need now is to protect, not exploit, the lake as a natural resource.

salmon

"Erosion is a natural process of wearing away, which man has made worse in some places in his attempts to control it. Natural shoreline erosion is a result of wind, wave, and current action. The reason erosion has become a problem is that, as more people want to use the shore, they attempt to stop the process of change... In many instances, man has erected buildings and other heavy structures too close to the shoreline or on a shoreline that is subject to erosion, without regard to the continuing process of change that occurs in the coastal zone.

trout

"Future policy of shoreline protection should be based upon an understanding of natural processes, which can be restored by planning to limit development on natural shorelines. Currently new thinking and research into the management of precious shorelines emphasize conservation using a comprehensive planning approach and structural set-back requirements to deal with the problem..."

The Lake Michigan Federation has been a strong force in fighting for the Lake. Just what is this organization? According to their membership brochure, it is an "environmental, nonprofit, private organization serving the four states surrounding the lake: Illinois, Wisconsin, Indiana, and Michigan, to develop an enlightened citizenry willing to be actively involved in public policy decisions affecting the Lake. Vital areas of concern include: air and water quality standards, nuclear safety issues, power plant siting, industrial pollution, wastewater management, shore erosion and long-term planning for the wise use and conservation of our natural resources."

The Federation is planning a long-term program on

GREAT LAKES TOMORROW
1975-1978
Citizens will be involved.

The Federation is also planning workshops on public access to Lake Michigan.

In January, 1975, the Committee on Lake Michigan of the Illinois House of Representatives (Rep. Robert E. Mann, Chairman) presented its report to the House of Representatives with suggestions for legislation. This committee dealt with the issues of:

- the Illinois program for shoreland management planning under the federal Coastal Zone Management Act of 1972
- causes of shoreline erosion
- effects of proposals to increase the rate of diversion of Lake Michigan water by Illinois
- implementation of the 1972 amendments to the Federal Water Pollution Control Act by the Illinois Environmental Protection Agency; these amendments set policy to completely stop water pollution by 1985.

There are many knotty problems concerned with Lake Michigan. Some of them surface from time to time. Others have remained afloat for a long period. Consider:

- "who owns the shoreline" or public access--one of the most difficult; there are advocates of public ownership of the shoreland who say land along the shoreline should not be in private ownership because they claim it should be a resource for the public and also because it is continuously built up and worn away by natural processes, often damaging private dwellings which should not be built there. Private owners cannot get private insurance and claim that the Government should furnish them with that protection.
- how do you protect the shore? (erosion control)
- a (third) airport for Chicago in the Lake--as of summer, 1975, this seems to be a dead issue
- other islands in the Lake--suggested for a sports complex or for less intensive recreational use
- siting of power plants
- who owns the Lake bottom? It has been decided that the State does; however, when the water level varies, what is the coastal zone?
- water from Lake Michigan for municipal use--some Illinois communities already use Lake Michigan water; others would like to
- how do you decide where industry should be allowed to build along the shore? What about past development?
- what do you do with dredgings from harbors, which can no longer be dumped in the open lake because they are polluted?

As you can see, these are complex issues that will not be resolved easily or quickly.

Over the years Lake Michigan has been of great importance to Illinois. In fact, life in our state would undoubtedly have been quite different without it. It is a unique natural resource whose value cannot be determined. The Lake Michigan Federation members believe it is essential that we learn how to use it without destroying it. What do you think?

THINGS TO DO:

- ▶ Visit the Indiana Dunes National Lakeshore near Chesterton, Indiana
- ▶ Read the section of this Sampler on the Indiana Dunes National Lakeshore

- Read about the geological formation of all the Great Lakes and their far-reaching importance.
- Read about the St. Lawrence Seaway.
- If your community uses Lake Michigan water, arrange to visit your filtration plant.
- School groups (grades 4-12) can visit the Shedd Aquarium in Chicago for programs on the biology of Lake Michigan--fishes, plankton, and the changes in the Lake caused by people; for reservations, write or phone: Education Department, Shedd Aquarium, 1200 S. Lake Shore Drive, Chicago, Illinois 60605 (312) 939-2426.
- Write the Lake Michigan Federation, 53 W. Jackson, Chicago, Illinois 60604 for a membership application or publications listed in the Bibliography of this chapter.
- Arrange for a slide show on Lake Michigan which introduces people to the Lake and specifically to the Illinois shoreline, showing diverse land use and problems. This slide show as well as a list of publications is available from the Coastal Program, Division of Water Resources, State of Illinois, Room 1010, 300 N. State, Chicago, Illinois 60610, (312) 793-3126.
- Teachers may want to obtain a free copy of the map-brochure listed in the Bibliography below. Send your address, name of your school, and grade level to the Lake Michigan Federation, 53 W. Jackson, Chicago, Illinois 60604. This service was made possible by a grant from McDonald's Corporation.

Available from Illinois Environmental Protection Agency, 2200 Churchill Road, Springfield, Illinois 62206

Lake Michigan Quality Report. 1974. (Issued annually). Contents include: Water Quality Monitoring - Beach and Water Plant Sampling; Special Sampling - Pesticides, PCB's and phthalates in Fish and Water; and Illinois Discharges.

BOOKS TO ENJOY:

Publications available from the Lake Michigan Federation, 53 W. Jackson, Chicago, Illinois 60604

Lake Michigan Current. A publication of the Illinois Coastal Zone Management Program. Vol. 1, No. 1, Summer, 1975 (5 issues are planned). Free.

Man's Impact on Lake Michigan. Map-brochure. March, 1974. $1.50.

Toward Keeping a Great Lake Great. 1973-74. Annual Report.

Why Lake Michigan Is Dying. A Speech by Jacob D. Dumelle, member, Illinois Pollution Control Board, before the Lake Michigan Water Analysts. June 8, 1973.

Ellis, William Donahue. Land of the Inland Seas. The Historic and Beautiful Great Lakes Country. 1974. High School - up. $13.95.

Open Spaces/Green Areas

Introduction

SPACE SPACE Space ! How remarkable; all around us and we cannot see it. We sense it, such as the margins on this page or the gaps between words, when something is there to bring it into focus.

You may catch some vibrant aspects of space... by examining many kinds of art, especially the more traditional Japanese paintings and delicate line sketches.

There are the vast interstellar reaches that stagger our imagination; the molecular-microscope penetrations of intra- and inner- cellular worlds; the clean-cut, beautiful patterns we silently see as we walk through a woods after a driving snowstorm; the myriads of intimate, fundamental arrangements and textures of blades of grass and leaves of trees; the delicate wind-wafted odors of flowers; and the progression of seasons and time- all spatially oriented.

There are the psychological and sociological "people spaces" and animal territories; the stops, rests and beats of music which create rhythms and moods. There is an infinity of spatial relationships, including those very personal, reflective thought-interludes and day-dreaming engaged in by most of us. The factory worker welcomes the break spaces.

Without space, life, as we know it, could not exist. SPACEismorefundamentalthanweperhapsrealize.

How strange that we have not incorporated more teaching/learning about the universality, the all-pervading reality and spirit of space in all of education. Fortunately, skilled ecologists, engineers, geographers, psychologists, and planners are giving more attention to space and how it is a part of and influences everything we do.

Teachers and interpreters at outdoor education campuses, arboretums and nature centers, forest and conservation preserves, parks, and wildlife refuges face an important challenge in introducing aspects of space to a wide variety of visitors. This is not a particularly easy challenge. Arboretums demonstrate space qualities in styles of landscaping.

In this chapter of the SAMPLER, we shall be concerned largely with some special spaces: greenways, parks, forest and nature preserves, open lands, arboretums, uncluttered "viewing borders" of such magnificent vistas as Lake Michigan and the dome of the sky. In other chapters we have looked along streets, in greenhouses and conservatories, in backyards, plazas, and vacant lots.

With care, we can wander into many of these special places, or at least "reflect" and delight in viewing their beauty.

All the spatial inputs and outputs of nature are ours, although some turning in might require preparations ahead and highly sophisticated methods and equipment.

Space astronauts caught inspiring views of the earth and sensed the beauty and wholeness of its energy-flowing processes. How precious are all of the inter-related ecosystems of Spaceship Earth; here are natural working spaces of the world so finely tuned after millions of years of evolvement. Yet, how much of these systems, before knowing what they were, we have already destroyed, damaged, or cluttered.

Thanks to the dedicated help and money from a handful of foresighted individuals and groups, we are managing to cling to a few but pitifully small remnants of natural areas, parks, open lands, nature centers (green islands), and uncluttered vistas.

Quite probably, the more people there are crowded into cities and suburbs and the more we push man-made things and operations into all kinds of open space, the closer we may be pushing ourselves to a state of insanity. Here, in brief, may be the process we suspect is at the root of all forms of pollution.

In many ways, this chapter of the SAMPLER could change your values and views of life, but you must discover and have courage to push your curiosity. We "stare into space" and scarcely realize how marvelously close we are to recapturing the essence of creation. "SPACE" is indeed one of the great concept words concocted by human beings.

Douglas E. Wade
Lorado Taft Field Campus
Northern Illinois University

Illinois has a variety of open spaces and green areas. Open space has been defined as consisting of "land and water area which is retained or restored to a condition in which the natural environment predominates". These areas take many forms and have many names--forest preserves, parks, wildlife refuges, nature preserves, natural areas, and conservation areas as well as golf courses and bike, horseback riding, and hiking trails. The trails may be within or near some of the forest preserves and other areas.

If you "use" outdoor areas, have you stopped to think what attracts you? Why do you think other people spend leisure in various ways in parks or other open spaces? You may have observed, or been part of, the crowds of people, particularly on summer weekends, who flock to the many open areas.

You may be a person who wants space for a picnic or someone who seeks renewal of the spirit in the colors and patterns of nature, in the quiet away from man-made noise, in solitude removed from the rushed surroundings where most of us spend much of our time. Stop for a moment and try to think what might happen if people did not have open lands and green areas to enjoy. People feel better just knowing these areas are close by, even if they do not go there often. Thus, these areas have the value of a safety valve in addition to their other assets.

These areas may help us to understand the workings of the natural world and the inter-relationships of people and the natural environment, which many people

consider essential for the survival of human beings. Countless people have been so removed from the workings of the natural world that they are not aware of their own reliance on soil, air, sunlight, and water and on the place of human beings in the scheme of things.

In many of these open areas there is opportunity for a variety of activities--for people alone, with families, with groups of different sizes.

The following sections of this chapter present information on different types of open spaces/green areas.

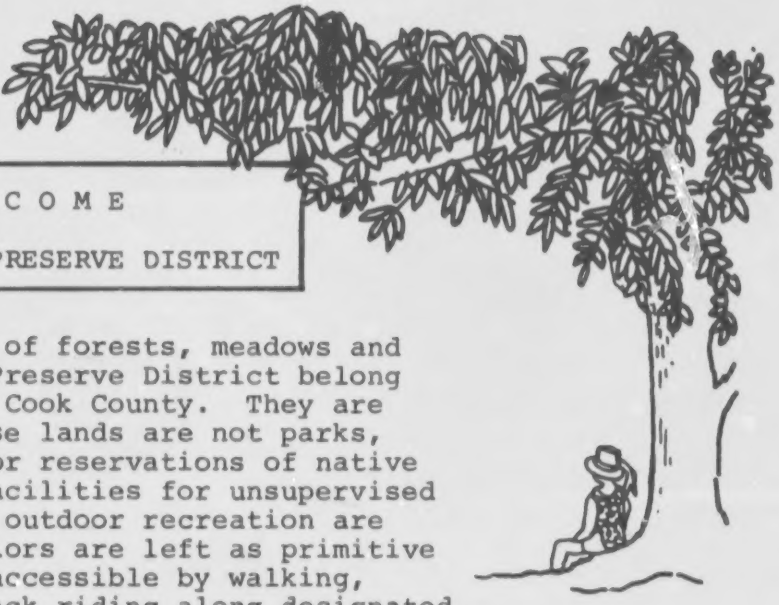
Forest Preserve Districts/Conservation Districts

In size, variety of facilities and terrain, accessibility, present use, and potential, the forest preserves and conservation district areas of Illinois are an invaluable asset. Past, present, and future residents of this state owe a tremendous debt of gratitude to the dedicated, visionary individuals who worked over the years to have this land set aside for public use. Though the general goal of these two kinds of districts is to acquire and preserve land for recreation and education for the public, forest preserve districts and conservation districts differ in taxing ability and in the set-up of their governing bodies. The conservation districts have more flexibility in how they can acquire land.

The forest preserve commissioners are the county board members, acting in another capacity. They are paid for their work as forest preserve commissioners.

Conservation districts have a board of five trustees who are appointed by the chairman of the county board with the consent of the board. They serve without pay.

Five of the six northeastern Illinois counties have forest preserve districts in various stages of development. The sixth count--McHenry--has a conservation district formed in 1971. In the rest of Illinois there are six forest preserve districts and four conservation districts.



WELCOME

TO YOUR FOREST PRESERVE DISTRICT

"The 64,000 acres of forests, meadows and water of the Forest Preserve District belong to all the people of Cook County. They are yours to enjoy. These lands are not parks, but are sanctuaries or reservations of native landscape. Simple facilities for unsupervised appropriate forms of outdoor recreation are provided. The interiors are left as primitive as possible and are accessible by walking, bicycling and horseback riding along designated trails. Motorcycles, motor bikes and other motorized vehicles are not permitted on trails."

"Suggestions for Pleasant Outings" in the following lovely language are given with a map indicating the location of many of the sites.

"Outings in the Forest Preserve District are enjoyable, inexpensive, relaxing and healthful. Hiking along any portion of the 175 miles of trails, winding their devious ways through woodlands and meadows offer a seasonal change of panoramic beauty--a canopy of trees overhead --fields adorned with wild flowers. Hike, but do it slowly--stop occasionally and listen to the pace of the woods, or watch for wildlife at work or play. Wear comfortable clothing and stout walking shoes--carry a candy bar or sandwich in your pocket. Early morning walks are most rewarding. For it is then that the wildlife is most active. An outdoor breakfast is an experience that will not be forgotten.

Other activities may be added to your outings--watch the migration of waterfowl and songbirds in spring and fall...fishing, horseback riding--spring wildflowers along with hawthorn and crabapple bloom time--fall colors and fruits --or just loaf along the edge of some pond or stream to enjoy the sights and sounds of the wilderness. These are the things that furnish relaxation and give strength to body and soul alike."*

*from the brochure of the Forest Preserve District of Cook County

Forest Preserve/Conservation Districts

(Information on these Districts is on the following yellow pages)

*No answer was received to our request for information; direct inquiries to the address given.

*Champaign County Forest Preserve District
P.O. Box 424, Mahomet, Illinois 61853

DeKalb County Forest Preserve District

Kendall County Forest Preserve District
Fox Road, Yorkville, Illinois 60560

*Piatt County Forest Preserve District
Bement, Illinois 61856

Rock Island County Forest Preserve District

*Winnebago County Forest Preserve District
Memorial Hall, Rockford, Illinois 61101

COUNTY CONSERVATION DISTRICTS

Boone County Conservation District

Macon County Conservation District

*Putnam County Conservation District
(Director, Dennis Ford, R.R., McNabb, Illinois 61335)

*Vermilion County Conservation District
703 Kimber, Danville, Illinois 61832

DEKALB COUNTY FOREST PRESERVE DISTRICT

Name of Site and Location	Acres	Boating	Drinking Water and Toilets	Fishing	Hiking	Historic	Horseback Riding	Shelter	Winter Sports Area	Youth Group Camping	Features
Russell F.P.	122		x	x	x			x	x	x	
Sannauk F.P.	73		x	x	x			x	x	x	
Chief Shabbona F.P.	88		x		x	x		x	x		
Afton Township	240										Undeveloped as of now; plans for lake area, winter sports area, camping, shelter

For further information, write or phone:
Director, Dekalb County Forest Preserve District
Court House Annex
Sycamore, Illinois 60178
(815) 895-9161, Extension 34

FOREST PRESERVE DISTRICT OF KENDALL COUNTY

Name of Site and Location	Acres	Boating - Canoe only	Drinking Water, Toilets	Fishing	Hiking	Historic	Horseback Riding	Shelter	Winter Sports Area	Youth Group Camping	Features
Harris Forest Preserve	85	x	x	x	x			x		x*	
Lyon Nature Preserve	20				x						
Baker Woods	23		x	x	x			x			
House's Grove	10		x	x				x		x*	
Maramech											Undeveloped

* 4-H and Scouts

ROCK ISLAND COUNTY FOREST PRESERVE DISTRICT

Name of Site and Location	Acres	Boating	Drinking Water and Toilets	Fishing	Hiking	Historic	Horseback Riding	Shelter	Winter Sports Area	Youth Group Camping	Features
Niabi Zoo Coal Valley, Ill.	227		x								
Illiniwek Hampton, Ill.	200	x*	x	x	x	x		x		x	60 pads "New" Camping Elec. Water Hook up, Shower and Restroom
Indian Bluff Milan, Ill.	200		x			x		x			Golf only
Loud Thunder Ill., City, Ill.	1,600	x	x	x* and **	x	x	x	x		x	Chief Black Hawk Trail **Lake man-made 167 acres; 8 miles shore line

For further information, write or phone:
Administrator
Rock Island County Forest Preserve District
County Office Building
Rock Island 61201

*Mississippi River
**"Lake"

BOONE COUNTY CONSERVATION DISTRICT

Name of Site and Location	Acres	Boating	Drinking Water and Toilets	Fishing	Hiking	Historic	Horseback Riding	Shelter	Winter Sports Area	Youth Group Camping	Features
Kinnikinnick Creek Conservation Area and Nature Preserve (3.3 miles N. of Caledonia	450+		x	x	x	x		x	x		Rolling wooded hills; small spring-fed creek. Part of the Ill. Nature Preserve System.
Spencer Park (West of Belvidere)	53		x	x	x	x		x			Scenic Recreation Area; was once the County Fair Grounds for almost 100 yrs.
Flora Prairie (1/2 mile E. of Winn. Co. Line on Poole Road	10				x	x					Preserve on a Dry Prairie for educational use only.

PUTNAM COUNTY CONSERVATION DISTRICT

Name of Site and Location	Acres	Boating	Drinking Water and Toilets	Fishing	Hiking	Historic	Horseback Riding	Shelter	Winter Sports Area	Youth Group Camping	Features
1) Natural Land Area 4.5 mi. West of McNabb	270		x		x			x		x	Youth camping with special permission.
2) Lake Senachwine Conservation Area 3 mi. East of Putnam	430	x		x							
3) Fox Run Conservation Area 4 mi. North of Granville	260						x				

For further information, write or phone: Dennis R. Ford, Director, 302-R South McCoy Street/Box 847, Granville, Il. 61326

MACON COUNTY CONSERVATION DISTRICT

Name of Site and Location	Acres	Boating	Drinking Water and Toilets	Fishing	Hiking	Historic	Horseback Riding	Shelter	Winter Sports Area	Youth Group Camping	Features
Rock Springs Center for Environmental Discovery; SW of Decatur	1,200		x	x	x	x		x			*Unique natural area along Sangamon River, Outdoor education center, interpretive programs, trails, picnic area, abundant flora & fauna
Friends Creek County Park, NE of Argenta	422		x	x	x			x		x	Beautiful natural area with camping, picnicking, group area, trails, interpretive programs
Big Creek Activity Area, E. of Mt. Zion	198			x	x		x				Primitive area. Day use and camping by permit only. Unique natural area.
Sand Creek Open Space Reservation, S. of Decatur	550+			x	x						Primitive area. Day use and camping by permit only. Much variety.

MACON COUNTY (CONT.)

Name of Site and Location	Acres	Boating	Drinking Water and Toilets	Fishing	Hiking	Historic	Horseback Riding	Shelter	Winter Sports Area	Youth Group Camping	Features
Griswold Conservation Area. W. of Blue Mound	42										Glacial Kame. Undeveloped. Available to educational groups on request basis.

Publications:
- *Your Guide to the Rock Springs Center for Environmental Discovery
- The Macon County Conservation District Plan for Environmental Conservation and Outdoor Recreation.

For further information, write or phone:

Rock Springs Center, M.C.C.D.
R.R. 2, Box 255
Decatur, Illinois 62521
Phone: 217 423-7073

Macon County Conservation District
735 North Main Street
Decatur, Illinois 62521
Phone: 217 423-7708

Local Parks

Almost all municipalities have parks of some kind, perhaps in the town square or scattered around in a larger community. Parks may be the responsibility of a department of municipal government or a separate single-purpose unit. Both local park departments and districts have been broadening their horizons. Moving from more limited goals of providing playgrounds, picnic areas, ball fields, and perhaps a few other facilities, many park programs now are varied and appeal to people with many different interests. A year-round activity program is offered, in some places, in cooperation with the schools, using school facilities after hours and in summer. Such cooperation between different governmental agencies is most encouraging.

Programs may include:

- garden plots made available on park land
- centers for senior citizens, some including hot noon meals
- activity programs for all ages with such varied offerings as sports, crafts, field trips, drama, and nature study
- family movies in the park.

To acquaint yourself with the facilities of your local park district or department, look in the phone book. You may want to learn:

- what sort of program your local park district offers
- if it is well used
- if the sites are easily accessible to people in the area
- if the district has enough open space
- whether your park district needs public support for acquiring more land or enlarging their program
- if so, what might you do to help?

Land under the Illinois Department of Conservation

The Illinois Department of Conservation is responsible for the "preservation, conservation, and enhancement" of our state's natural and cultural resources, managing more than 284,000 acres of land. The Department tries to maintain a balance between "protecting the environment and insuring quality recreational experiences for the visitor".

The following four pages are from an Illinois Department of Conservation Recreational Areas brochure. For further information write to Information/Education Section, Department of Conservation, State Office Bldg, Springfield, Illinois 62706.

ILLINOIS STATE PARKS

INDEX KEY				ACREAGE	CAMPING	ELECTRICITY	SANITARY DUMP STATION	PICNICKING	REFRESHMENTS	DRINKING WATER	TOILETS	MUSEUM	FISHING	BOATING	BOAT RENTALS	LAUNCHING RAMP	MOTORS	HIKING	HORSE TRAILS	HORSE CAMPGROUND	HUNTING	SUMMER INTERPRETIVE PRO.	YR. ROUND INTER. PROGRAM
A-4	1	Apple River Canyon	Apple River, 61001 ph: 815-745-3302	29[illegible]	B		●	●	●	●	●		●					●					
G-3	2	Argyle Lake	R.R. No. 2, Colchester, 62326 ph: 309-776-3422	1052	B	●	●	●	●	●	●		●	●	●	●	10	●				●	
J-5	3	Beaver Dam	R.R. No. 2, Box 128, Plainview, 62676, ph: 217-854-8020	737	B	●	●	●	●	●	●		●	●	●	●	E	●					
D-3	4	Black Hawk	1500 - 47th Ave., Rock Island, 61201, ph: 309-788-9536	206				●	●	●	●	●						●					
D-7	5	Buffalo Rock	R.R. No 1, Ottawa, 61350 ph: 815-433-2220	43				●	●	●	●							●					
K-4	6	Cahokia Mounds	7850 Collinsville Rd., E. St. Louis, 62201 ph: 618-344-5268	650	B	●		●	●	●	●	●						●					●
N-9	7	Cave-in-Rock	Cave-in-Rock, 62919 ph: 618-289-4325	64	B	●		●	●	●	●		●	●			●	●					
A-9	8	Chain O'Lakes	725 E. St. Park Rd., Spring Grove, 60081 ph: 312-587-5612	4892	A	●	●	●	●	●	●		●	●	●	●	10	●			●	●	
E-2	9	Delabar	Oquawka, 61469 ph: 309-867-3671	89	B	●	●	●	●	●	●		●	●		●	no	●					
O-8	10	Dixon Springs	R.R. No. 1, Brownfield, 62911 ph: 618-949-3394	496	B	●		●	●	●	●							●					
I-9	11	Douglas County	R.R. No. 2, Oakland, 61943 ph: 217-346-3336	464				●			●		●	●		●	E	●					
I-7	12	Eagle Creek	103 W. So. 2nd St., Findlay, 62534, ph: 217-756-8260	2173	B		●	●		●	●		●	●		●	●	●			●		
K-6	13	Eldon Hazlet	1351 Ridge St., Carlyle, 62231 ph: 618-594-3015	3000	B	●	●	●		●	●		●	●		●	●	●			●		
N-7	14	Ferne Clyffe	Box 125, Goreville, 62939 ph: 618-995-2411	1073	A	●	●	●		●	●		●				no	●	●	●		●	
M-4	15	Ft. de Chartres*	Prairie-Du-Rocher, 62277 ph: 618-284-2466	1100				●	●	●	●	●						●				●	●
F-5	16	Ft. Creve Coeur	Near Peoria	86														●					
P-6	17	Ft. Defiance	Box 77, Miller City, 62962 ph: 618-776-5281	38				●		●	●		●	●			●						
M-5	18	Ft. Kaskaskia	Ellis Grove, 62241 ph: 618-859-3741	250	B			●		●	●		●					●					●
O-8	19	Ft. Massac*	Box 708, Metropolis, 62960 ph: 618-524-4712	1380	B			●		●	●	●	●	●			●						
I-9	20	Fox Ridge	R.R. No. 1, Charleston, 61920 ph: 217-345-6416	751	B		●	●	●	●	●		●	●			[illegible]						
L-4	21	Frank Holten	4500 Pockett Rd., E. St. Louis 62205, ph: 618-874-792	1125	B	●		●	●	●	●		●	●		●	[illegible]						
D-8	22	Gebhard Woods	R.R. No. 3, Box 292, Morris, 60450 ph: 815-942-0796	30				●		●	●		●					●					
N-6	23	Giant City	Makanda, 62958 ph: 618-457-4836	3100	A	●	●	●	●	●	●		●	●		●	10	●	●	●			●
D-8	24	Goose Lake Prairie	RFD No. 1, Morris, 60450 ph: 815-942-2899	2292				●		●	●							●					●
D-5	25	Hennepin Canal Parkway	Box 456, Sheffield, 61361 ph: 815-454-2328	5921				●		●	●		●	●		●	10	●	-	●			
D-7	26	Illini	R.R. No. 1, Box 60, Marseilles, 61341 ph: 815-795-2448	510	B	●	●	●	●	●	●		●	●		●	●	●				●	
A-9	27	Illinois Beach	Zion, 60099 ph: 312-662-4811	2746	A	●	●	●	●	●	●		●					●				●	●
D-5	28	Johnson Sauk Trail	R.R. No. 3, Kewanee, 61443 ph: 309-853-5589	857	B	●	●	●	●	●	●		●	●	●	●	no	●				●	
F-5	29	Jubilee College*	R.R. No. 2, Box 72, Brimfield, 61517, ph: 309-243-7683	1528	B	●	●	●		●	●							●					
E-9	30	Kankakee River	R.R. No. 1, Bourbonnais 60914 ph: 815-933-1383	2700	B	●	●	●	●	●	●		●	●		●	10	●			●	●	
G-10	31	Kickapoo	R.R. No. 1, Oakwood, 61858 ph: 217-442-4915	1684	B	●	●	●	●	●	●		●	●	●	●	E	●				●	
A-5	32	Lake Le-Aqua-Na	R.R. No. 2, Lena, 61048 ph: 815-369-4282	715	A	●	●	●	●	●	●		●	●	●	●	E	●	●	●		●	
N-6	33	Lake Murphysboro	R.R. No. 1, Murphysboro, 62966 ph: 618-684-2867	904	B	●	●	●	●	●	●		●	●	●	●	10	●					
K-4	34	Lewis and Clark	223 St. Louis Rd., Collinsville 62234 ph: 618-344-5668	168				●			●		●					●					

ILLINOIS STATE PARKS

INDEX KEY				ACREAGE	CAMPING	ELECTRICITY	SANITARY DUMP STATION	PICNICKING	REFRESHMENTS	DRINKING WATER	TOILETS	MUSEUM	FISHING	BOATING	BOAT RENTALS	LAUNCHING RAMP	MOTORS	HIKING	HORSE TRAILS	HORSE CAMPGROUND	HUNTING	SUMMER INTERPRETIVE PRO.	YR. ROUND INTER. PROGRAM
I-9	35	Lincoln Log Cabin*	R.R. No. 2, Lerna, 62440 ph: 217-345-6489	86	C			•		•	•	•											
J-10	36	Lincoln Trail	R.R. No. 1, Marshall, 62441 ph: 217-826-2222	974	A	•	•	•	•	•	•		•	•	•	•	10					•	
H-7	37	Lincoln Trail Homestead	R.R. No. 1, Box 126, Mt. Zion, 62549 ph: 217-864-3121	162	D			•		•	•		•										
H-5	38	Lincoln's New Salem*	New Salem, 62659 ph: 217-632-7953	522	A	•	•	•	•	•	•	•											•
C-6	39	Lowden	R.R. No. 2, Oregon, 61061 ph: 815-732-6828	207	B	•	•	•	•	•	•		•	•				•				•	
B-8	40	McHenry Dam & Lake Defiance	914 S. River Rd., McHenry, 60050 ph: 815-385-1624	94				•	•	•	•		•	•	•		•	•					
D-7	41	Matthiessen	Box 381, Utica, 61373 ph: 815-883-8807	1531				•	•	•	•							•					
B-4	42	Mississippi Palisades	Box 364, Savanna, 61074 ph: 815-273-2731	1716	A	•	•	•		•	•		•	•	•	•	•	•	•	•		•	•
C-5	43	Morrison-Rockwood	205 E. High, Morrison 61270 ph: 815-772-4708	1152	B			•		•	•		•	•		•	10						
F-1	44	Nauvoo*	Box 337, Nauvoo, 62354 ph: 217-453-2512	148	B	•	•	•	•	•	•	•	•	•		•	10	•					
J-3	45	Pere Marquette	Box 325, Grafton, 62037 ph: 618-786-3785	8000	A	•	•	•	•	•	•	•	•	•	•	•	•	•	•			•	•
C-5	46	Prophetstown	205 E. High, Morrison ph: 815-772-4708	54	B	•		•		•	•		•										
M-6	47	Pyramid	RFD No. 1, Box 115-A, Pinckneyville, 62274 ph: 618-357-2574	2524	B			•			•		•	•			10	•	•		•		
H-6	48	Railsplitter	R.R. No. 3, Lincoln, 62656 ph: 217-735-2424	748				•			•		•										
J-7	49	Ramsey Lake	Box 433, Ramsey, 62080 ph: 618-423-2215	1880	A	•	•	•	•	•	•		•	•	•	•	5	•			•	•	
K-9	50	Red Hills	R.R. No. 4, Sumner, 62466 ph: 618-936-2469	9218	A	•	•	•	•	•	•		•	•	•	•	E	•	•		•	•	
B-7	51	Rock Cut	R.R. No. 1, Box A-49, Caledonia 61011 ph: 815-885-3311	2400	A	•	•	•	•	•	•	•	•	•	•	•	10	•	•			•	•
J-9	52	Sam Parr	R.R. No. 5, Newton, 62448 ph: 618-783-2661	1063	C			•			•		•	•		•	10	•			•		
I-6	53	Sangchris Lake	R.R. No. 1, Rochester, 62563 ph: 217-637-9288	4200	B	•	•	•		•	•		•	•		•	10	•					
H-2	54	Siloam Springs	R.R. No. 1, Clayton, 62324 ph: 217-894-6205	3026	B	•	•	•	•	•	•		•	•	•	•	E	•	•	•	•		
D-8	55	Silver Springs	R.R. No. 1, Box 238, Yorkville, ph: 312-553-6297	1314	D			•		•	•		•	•				•					
K-6	56	South Shore	1351 Ridge St., Carlyle, 62231 ph: 618-594-3015	850				•		•	•		•	•			•	•					
H-7	57	Spitler Woods	P.O. Box 705, Spitler Park Drive, Mt. Zion, 62549, ph: 217-864-3121	202	D			•		•	•							•					
D-7	58	Starved Rock	Box 116, Utica, 61373 ph: 815-667-4726	2366	B		•	•	•	•	•		•	•	•	•	•	•				•	•
K-7	59	Stephen A. Forbes	R.R. No. 1, Kinmundy, 62854 ph: 618-547-3381	3019	B	•	•	•	•	•	•		•	•	•	•	•	•			•		
M-7	60	Wayne Fitzgerrell	P.O. Box D, Benton, 62812 ph: 618-438-5781	3010	C			•			•		•	•			•	•			•		
G-2	61	Weinberg-King	P.O. Box 203, Augusta, 62311 ph: 217-392-2345	772				•		•	•		•					•	•				
H-7	62	Weldon Springs	R.R. No. 2, Clinton, 61727 ph: 217-935-2644	370	B	•	•	•	•	•	•		•	•	•	•	E	•					
C-6	63	White Pines Forest	R.R. No. 1, Mt Morris, 61054 ph: 815-946-3717	385	B		•	•	•	•	•		•					•				•	
D-8	64	Wm. G. Stratton	R.R. No. 3, Morris, 60450 ph: 815-942-0796	6				•	•	•	•		•	•		•	•	•					
[illegible]-7	65	Wolf Creek	103 W. South 2nd St., Findlay, 62534 ph: 217-756-8260	1966	B	•	•	•		•	•		•	•		•	•	•	•	•	•		

ILLINOIS HISTORICAL MEMORIALS

E-4	1	Bishop Hill*	Bishop Hill, 61419 ph: 309-927-3520	4				●		●	●	●											●
H-8	2	Bryant Cottage*	146 E. Wilson Ave., Bement, 61813 ph: 217-678-8184	½						●	●	●											●
L-4	3	Cahokia Courthouse*	112 M. Street, Cahokia, 62206, ph: 618-332-1782	1						●	●	●											●
C-10	4	Douglas Tomb*	636 E. 35th Street, Chicago 60616 ph: 312-225-6353	2						●	●												
G-1	5	Ft Edwards	at Warsaw	6/100																			
M-5	6	Governor Bond	at Chester	½																			
K-4	7	Governor Coles	at Edwardsville	¼																			
M-5	8	Kaskaskia Bell	Ellis Grove, 62241 ph: 618-859-3741	2/5				●		●	●	●											
C-6	9	Lincoln Monument	Dixon, 61021	3/5				●		●		●	●										
K-10	10	Lincoln Trail Monument	R.R. No. 4, Sumner, 62466 ph: 618-936-2469	25				●		●	●			●			●						
H-5	11	Lincoln's Tomb*	Oak Ridge Cemetery, Springfield, 62702 ph: 217-828-2717	121						●	●												●
K-4	12	Lovejoy Monument	at Alton	1/10																			
F-6	13	Metamora Courthouse*	303 N. Hanover, Metamora, 61548 ph: 309-367-4470	1/5				●		●	●	●											●
I-9	14	Moore Home*	R.R. No. 2, Lerna, 62440 ph: 217-345-6489	2								●											
H-6	15	Mt. Pulaski Courthouse*	Box 102, Mt. Pulaski, 62548 ph: 217-792-3919	1						●	●	●											●
D-7	16	Norwegian Settlers	at Norway (LaSalle Co.)	1/10																			
A-4	17	Old Market House*	Market Square, Galena, 61036 ph: 815-777-2570	½						●	●	●											●
M-5	18	Pierre Menard Home*	R.R. No. 1, Box 58, Ellis Grove 62241, ph: 618-859-3031	2						●	●	●											●
G-6	19	Postville Courthouse*	214 — 4th Street, Lincoln 62656 ph: 217-732-8930	1				●		●	●												●
N-9	20	Shawneetown*	R.R. No. 1, Equality, 62934 ph: 618-272-4405	40				●		●	●			●									
A-4	21	U.S. Grant Home*	510 Bouthillier, Galena, 61036 ph: 815-777-0248	2				●		●	●	●											●
K-7	22	Vandalia Statehouse*	315 Gallatin, Vandalia, 62471 ph: 618-283-1161	2						●	●	●											●
D-7	23	Wild Bill Hickok	near LaSalle	2																			

Museums
Many have limited visiting hours. Check with the site before your visit.

ILLINOIS CONSERVATION AREAS

INDEX KEY				ACREAGE	CAMPING	ELECTRICITY	SANITARY DUMP STATION	PICNICKING	REFRESHMENTS	DRINKING WATER	TOILETS	MUSEUM	FISHING	BOATING	BOAT RENTALS	LAUNCHING RAMP	MOTORS	HIKING	HORSE TRAILS	HORSE CAMPGROUND	HUNTING	SUMMER INTERPRETIVE PRO.	[illegible]
G-4	1	Anderson Lake	R.R. No. 1, Astoria, 61501 ph: 309-759-4484	1364	B	•	•	•	•	•	•		•	•	•	•	10				•		
M-5	2	Baldwin Lake	R.R. No. 1, Baldwin, 62217 ph: 618-785-2555	2200							•		•	•		•	10				•		
L-10	3	Beall Woods	R.R. No. 2, Mt. Carmel, 62863 ph: 618-298-2442	635				•		•	•							•					•
D-9	4	Des Plaines	R.R. No. 3, Box 167, Wilmington 60481, ph: 815-476-7622	273									•								•		
M-8	5	Hamilton County	R.R. No. 4, McLeansboro, 62859 ph: 618-773-4340	1603	B	•	•	•	•	•	•		•	•	•	•	10	•			•		
E-2	6	Henderson County	Oquawka, 61469 ph: 309-867-3671	87	B			•		•	•			•			[illegible]	•					
O-6	7	Horseshoe Lake	Box 77, Miller City, 62962 ph: 618-776-5281	7901	B	•	•	•	•	•	•		•	•	•	•	10	•			•		
E-10	8	Iroquois County	Near Beaverville	1920																	•		
D-6	9	Lee County	R.R. No. 1, Box 56, Harmon, 61042 ph: 815-379-2324	480																	•		
G-7	10	McLean County	R.R. No. 2, LeRoy, 61752 ph: 309-724-8032	1616	B	•	•	•	•	•	•		•	•	•	•	10	•	•	•	•	•	
E-6	11	Marshall County	Box 293, Lacon, 61540 ph: 309-246-8351	2270	B	•		•	•	•	•		•	•			•	•			•		
O-7	12	Mermet Lake	R.R. No. 1, Belknap, 62908 ph: 618-524-5577	10				•					•	•		•	10				•		
G-1	13	Montebello	same as Nauvoo S.P.	3				•		•	•		•	•		•	•						
M-5	14	Randolph County	R.R. No. 1, Box 346, Chester, 62233 ph: 618-826-2706	1031	C			•	•		•		•	•	•	•	10	•	•		•		
G-5	15	Rice Lake	R.R. No. 3, Canton, 61520 ph: 309-647-9184	2370	B	•		•		•	•		•	•		•	10				•		
N-8	16	Saline County	R.R. No. 2, Equality, 62934 ph: 618-276-4405	1208	B			•	•	•	•		•	•	•		10	•	•	•	•		
L-8	17	Sam Dale Lake	R.R. No. 1, Johnsonville, 62850 ph: 618-835-2292	1301		•	•	•	•	•	•		•	•	•		10	•			•		
H-4	18	Sanganois	P.O. Box 38, Browning, 62624 ph: 217-323-3580	3162									•	•			•				•		
E-6	19	Sparland	near Sparland	1280									•	•			•						
G-5	20	Spring Lake	R.R. No. 2, Manito, 61546 ph: 309-968-6197	1946	B	•	•	•	•	•	•		•	•	•	•	10	•			•	•	
O-6	21	Union County	R.R. No. 2, Jonesboro, 62952 ph: 618-833-6175	40									•				[illegible]				•		
L-6	22	Washington County	R.R. No. 3, Nashville, 62263 ph: 618-327-3137	1378	A	•	•	•	•	•	•		•	•	•	•	10	•			•		
C-10	23	Wm. W. Powers	12800 Ave. O, Chicago, 60633 ph: 312-646-3270	580				•	•	•	•		•	•	•	•	10	•			•		
F-6	24	Woodford County	R.R. No. 1, Low Point, 61545 ph: 309-548-8861	2462	B	•	•	•		•	•		•	•	•	•	[illegible]				•		

ILLINOIS STATE FORESTS

E-2	1	Big River	Keithsburg, 61442 ph: 309-374-2496	1047	B			•		•	•	•	•	•							•		
J-7	2	Hidden Springs	Box 110, RFD No. 1, Strasburg, 62465 ph: 217-644-3091	314	C			•		•	•	•									•		
G-5	3	Sand Ridge	P.O. Box 82, Forest City 61532 ph: 309-597-2280	5504	C			•		•	•	•									•		
N-6	4	Trail of Tears	R.R. No. 2, Jonesboro, 62952 [illegible]	3558				•		•	•	•									•		

FISH HATCHERIES

Little Grassy--Williamson County, 10 miles southeast of Carbondale	largemouth bass, bluegill, and redear sunfish; at times smallmouth bass and channel catfish; goldfish fingerlings reared as forage for the bass; to arrange a visit, contact the Manager.
Spring Grove--northeast corner of McHenry County, 3 miles south of Illinois-Wisconsin state line and 4 miles north of Fox Lake	largemouth bass, bluegill, redear sunfish, chinook salmon; site includes marked nature trail; visits 8:30-3:00 7 days a week; tours for students and organizations should be arranged in advance by contacting the Manager, 7314 Hatchery Road, P.O. Box 157, Spring Grove 60081, (815) 675-2122

TREE FARMS

Mason Tree Nursery--(which is about 25 miles southwest of Peoria); the nursery is about 5 miles south of the Forest near Topeka	connected with the Sand Ridge State Forest in Mason County; has nature trails; arrange visit by contacting Forest Manager, P.O. Box 82, Forest City 61532, (309) 597-2260
Trail of Tears State Forest and Nursery (formerly Trail of Tears State Forest and Union Tree Nursery)--about 40 miles northwest of Cairo near the Mississippi River	visits can be arranged between 8:00 and 4:30, 5 days a week; contact Nursery Supervisor, Trail of Tears State Forest and Nursery, R.R. #1, Jonesboro 62952, (618) 833-6125.

For further information on these tree nurseries, write:

Department of Conservation
Division of Forestry
Room 611, State Office Building
Springfield, Illinois 62706

ILLINOIS
NATURE PRESERVE

Nature Preserves

Fens--peat bogs--tamarack bogs--upland forest--prairie--these are a few of the terms used to describe some of Illinois' nature preserves. Perhaps these terms are unfamiliar to you or known only through books, or perhaps known first-hand and loved. Whatever your previous experience, you may want to visit some of these natural eco-systems.

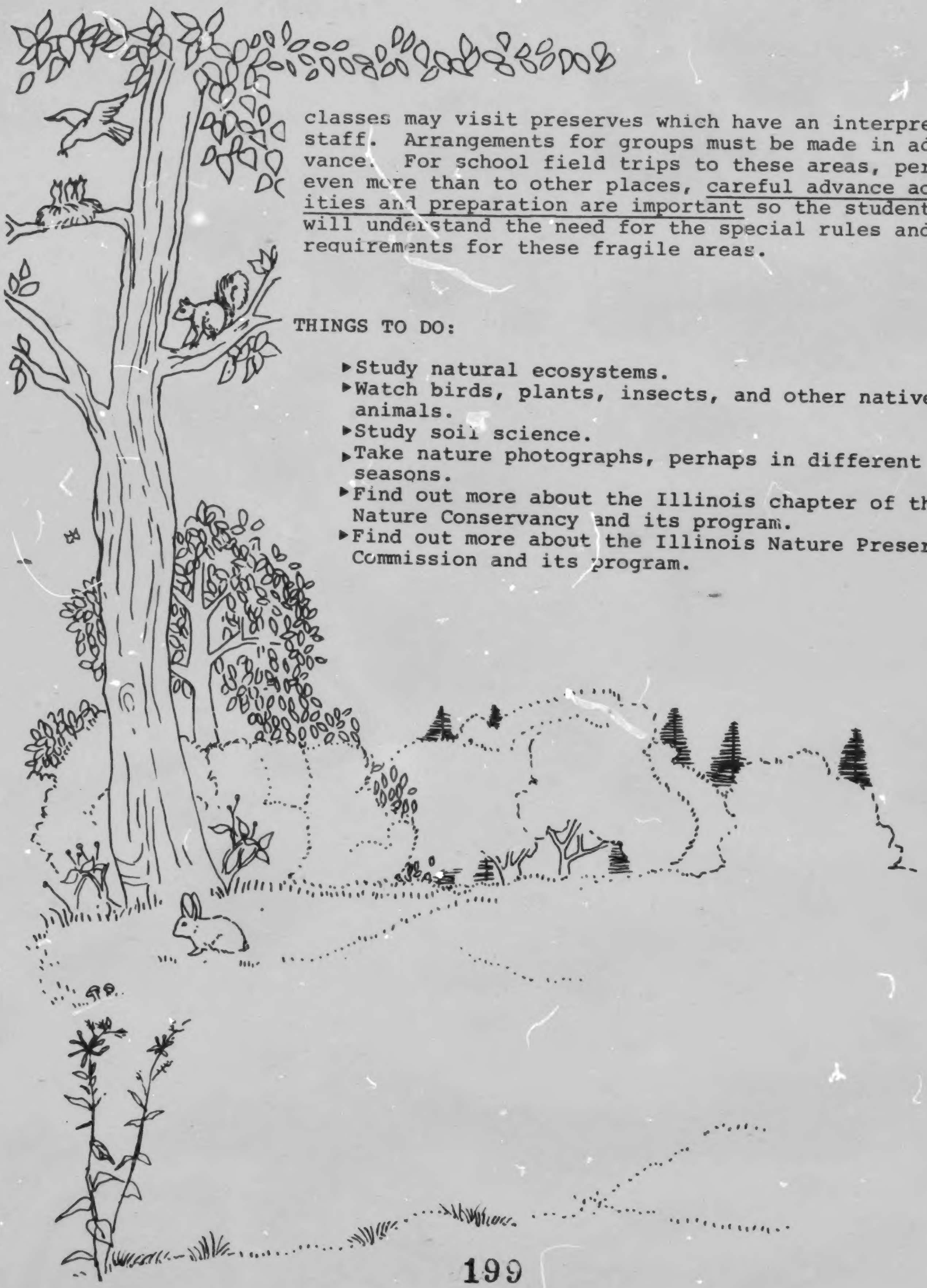
Nature preserves, as you may know, are areas of land or water, in private or public ownership, that must be maintained in their natural condition. They must be to some extent untouched or "have flora, fauna, geological or archeological features of scientific or educational value". Thought of as living museums, they are examples of the rich natural heritage of Illinois, so little of which is left, so much having given way to agricultural, urban, and industrial development.

In these nature preserves, as you might expect, the preservation of the natural ecosystems is the primary consideration. Since many parts of the preserves are fragile, irreplaceable environments, use is limited. (In contrast, parks and forest preserves are oriented to public recreation.) In nature preserves, one can hike by staying on marked paths and observe nature, except in some especially sensitive sections where even these activities are restricted. In addition, scientific and educational use is allowed, again only if natural conditions are not altered.

Groups such as primary and secondary school classes may visit preserves which have an interpretive staff. Arrangements for groups must be made in advance. For school field trips to these areas, perhaps even more than to other places, careful advance activities and preparation are important so the students will understand the need for the special rules and requirements for these fragile areas.

THINGS TO DO:

- Study natural ecosystems.
- Watch birds, plants, insects, and other native animals.
- Study soil science.
- Take nature photographs, perhaps in different seasons.
- Find out more about the Illinois chapter of the Nature Conservancy and its program.
- Find out more about the Illinois Nature Preserves Commission and its program.



Nature Preserves

Note: This information is adapted from the Illinois Nature Preserve's Two-Year Reports--1971-72, published in May, 1975, plus information on nature preserves dedicated since the second report.

Information on the nature preserves in the six northeastern Illinois counties is not contained here because it is in the original Environmental Curiosity Sampler.

"In wilderness is the preservation of the world."
Thoreau

ALEXANDER COUNTY--Horseshoe Lake Nature Preserve (492 acres)

Location: Two separate tracts within Horseshoe Lake Conservation area south of Olive Branch. One is southeast of the ranger headquarters, and the other is the southern end of Horseshoe Island.

Character: Forest, swamp, and oxbow lake. Horseshoe Island has a near virgin forest of beech, sugar maple, and swamp chestnut oak, with a bald cypress and swamp tupelo community in the sloughs and bordering Horseshoe Lake. The second tract contains second growth red oak, swamp chestnut oak, elm, and bitternut hickory with sweet gum, pin oak and Drummond's red maple in the wetter places.

Special features: Unusual plants include the red buckeye, cucumber magnolia, and willow oak. Notable animals include the mole salamander, cottonmouth and other southern swamp species.

Management and use: The preserve is managed by the Illinois Department of Conservation, Division of Wildlife Resources, as part of the Horseshoe Lake Conservation Area which is principally a winter refuge for geese. Wildlife biologists from Southern Illinois University began study of the deer herd on Horseshoe Island in 1971.

BUREAU COUNTY (AND PUTNAM COUNTY)--Miller-Anderson Woods Nature Preserve (258 acres)

Location: West of the Illinois River and Route 29, between Putnam and Bureau Junction.

Character: Upland, ravine, and valley forests. The forest is in near-virgin condition.

Special features: Luxuriant growth of spring wildflowers, ferns, and shrubs. Wildflowers include bloodroot, hepatica, wild ginger, and showy orchis. Seepage areas along the base of the hills have skunk cabbage and marsh-marigold. Ohio buckeye is here at the northern limit of its range.

BOONE COUNTY--Kinnikinnick Creek Nature Preserve (57 acres) within the Kinnikinnick Creek Conservation Area (450 acres)

Location: About 3 miles north of Caledonia on Caledonia Road.
Character: One of the best remaining examples of the original (oak-hickory) forests of the Rock River valley; the first forest of this type to be dedicated as a nature preserve; trails have been laid out; area has suffered from various degrees of disturbance by timber cutting and grazing.
Special features: Many wildflowers including skunk cabbage, white trillium, and shinleaf; are habitats for many kinds of wildlife.
Management and use: Dedicated as an Illinois Nature Preserve in spring, 1975; managed by the Boone County Conservation District; people are urged to stay on the trails.

CARROLL COUNTY--Ayers Sand Prairie Nature Preserve (109 acres nature preserve; 6 acres buffer)

Location: Three miles southeast of Savanna and one-half mile east of Ayers.
Character: Dunes and sand prairie of little bluestem, June grass, and hairy grama with scattered shrubs of aromatic sumac. A few black oak and cottonwood trees occur in blowouts.
Special features: Poppy mallow, blazing star, and western sunflower are among the more attractive wildflowers. The ornate box turtle and the six-lined racerunner are residents.
Management and use: An area of formerly cultivated land is being allowed to return to a natural condition. The preserve will be used in conjunction with the interpretive program at Mississippi Palisades State Park.
Owner and custodian: Department of Conservation, Springfield; Ranger, Mississippi Palisades State Park, Savanna.

EDGAR COUNTY--Baber Woods Nature Preserve (59 acres)

Location: Five miles northeast of Westfield.
Character: Mesic forest. A near-virgin forest of white oak, sugar maple, pignut hickory and black oak with a rich herbaceous flora.
Special features: The woods represents a remnant of a much larger forest that once occupied most of the Shelbyville Moraine. Most of the trees are large, with some of the oaks having a diameter exceeding 40 inches.
Owner and custodian: The Nature Conservancy, Evanston; Eastern Illinois University, Division of Life Sciences, Charleston.

History of preservation: The Baber family purchased the land in 1894 and cut some of the timber for fence posts and fuel, but according to Mr. Baber the woods has been left relatively undisturbed and no trees have been cut since 1898 except for the theft of two walnut trees about 5 years ago. The woods was never grazed while owned by the Baber family.

GRUNDY COUNTY--Goose Lake Prairie Nature Preserve (1,513 acres)

Location: North of Lorenzo Road, halfway between Morris and U.S. 66.

Character: Dry, mesic, and wet prairie; marshes; and potholes.

Special features: This prairie and marsh area supports a wide variety of wetland and prairie wildlife, including coyote, deer, and an abundance of waterfowl. Bell's vireo, Henslow's sparrow, and three species of rail are common.

Management and use: An advisory committee has developed a master plan for management of the preserve. Control of plant succession by cutting of hawthorns and by burning is being undertaken. A system of trails is being developed. In a part of the State holdings outside the nature preserve, an interpretive center will be built along with other visitor facilities. Visitors will find here an opportunity to gain a basic understanding of what the Illinois prairie was when the first explorers and settlers saw it.

Owner and custodian: Department of Conservation, Division of Parks and Memorials.

HANCOCK COUNTY--Cedar Glen Nature Preserve (142 acres)

Location: Part of the Kibbe Life Science Station of Western Illinois University on a bluff overlooking the Mississippi River between Hamilton and Warsaw.

Character: Land was heavily grazed and partially cleared over 35 years ago; mostly open land with scattered trees; remainder is woods reverting to second-growth forest.

Special features: Scenic, unique geologic features, diverse habitats, resting area for wintering bald eagles.

Use: For permission to use, contact Dr. John Wornock, Biological Science Department, Western Illinois University, at (309) 298-1272, or at Kibbe Life Science Station (217) 256-4583.

HANCOCK COUNTY--Mississippi River Sand Hills Nature Preserve, (45 acres)

Location: One-half mile east of Warsaw, south of the Great River Road.

Character: Sandy hill prairie, upland and valley forest. The hilltops support a prairie of little bluestem and other species. The forest includes oak, hickory, maple, and basswood.

Special features: The sand hills are an unusual formation not found elsewhere in the region.

Management and use: The area is close to Kibbe Field Station of Western Illinois University. It is to be leased to the University for management. The area is used by students from the field station.

Owner and custodian: Department of Conservation; Western Illinois University.

JACKSON COUNTY--Fern Rocks Nature Preserve (170 acres)

Location: Located south and west of Indian Creek and the park road in the north part of Giant City State Park (3,050 acres) near Makanda.

Character: Dry and mesic forest, cliffs and bedrock outcrops. The area includes dry bluff tops, cliffs, a floodplain and a rocky stream bed. The dry bluff tops contain a post oak-blackjack oak community. The steep hillsides contain white oak, black oak, shagbark hickory and flowering dogwood. A rich forest of sugar maple and red oak exists on north-facing slopes. The area contains an exceptional display of spring wildflowers.

Special features: Forbes saxifrage and French's shooting star are some of the rare species present. It also includes one of two known populations of the large-flowered white mint (Synardra hispidula) in this part of the Midwest.

Management problems: Some of the area has been damaged by trampling and uncontrolled collecting, and removal of signs by vandals. It should not be given extra publicity since it is already heavily used. Signs removed by vandals must be replaced periodically.

History of preservation: The area was first recognized for its natural values by George H. French, botanist at Southern Illinois University in the late 1800's. He collected the first known specimens of French's shooting star from the area and named it "Fern Rocks".

JASPER COUNTY--Prairie Chicken Nature Preserve (250 acres)

Location: North and east of Bogota.

Character: Mesic prairie farmland; the area is not in a natural condition.

Special features: These sanctuaries provide habitat for one of the two principal remaining flocks of the Greater Prairie Chicken in Illinois.

Management and use: The Illinois Natural History Survey and Department of Conservation manage the protected areas. The land is maintained in grass suitable for prairie chicken nesting. Observation of the prairie chicken booming in the spring is possible from blinds. Access to the sanctuaries is by permit from the Natural History Survey, Urbana.

JOHNSON COUNTY--Heron Pond - Wildcat Bluff Nature Preserve (1,111 acres nature preserve; 48 acres of buffer and service area)

Location: Four miles south-southwest of Vienna.
Character: Bottomland forest, swamp, and permanent stream and upland forest, limestone glade, and rock outcrops. The area includes a section of the floodplain of the Cache River bounded by a sheer bedrock escarpment to the north and low rocky bluffs to the east and west. The dominant trees of the swamps are swamp tupelo, bald cypress, and swamp cottonwood. The dominants of the bottomland forests are Shumard oak, cherrybark oak, swamp chestnut oak, mockernut hickory, big shellbark hickory, sweet gum, and catalpa. The upland forests are of white oak, chinquapin oak, red oak, and pignut hickory. Little bluestem and side-oats grama are dominant species of the limestone glade.
Special features: The diversity of natural types related to topography, bedrock and wetness make this an exceptional area. Many animals that are limited in Illinois to the Coastal Plain inhabit the area. These include the bird-voiced treefrog and the cottonmouth water moccasin. A heronry exists on Heron Pond. There are many unusual plants present.
Owner and custodian: Department of Conservation, Division of Parks and Memorials.

JOHNSON COUNTY--Round Bluff Nature Preserve (53 acres)

Location: South of the main park road and southwest of the lake in Ferne Clyffe State Park, 1 1/2 miles south of Goreville.
Character: Mesic forest of ravines and slopes, bluffs and bedrock outcrops, northern relict plants, and preglacial relict plants. The dry upland forest community consists of post oak, blackjack oak, and pignut hickory on dry blufftops. Mesic forests are of sugar maple, red oak, tulip tree, and bitternut hickory. Farkleberry, red cedar, and aromatic sumac are common shrubs of blufftops; and spicebush is abundant in mesic sites.
Special features: The north and northeast faces of Round Bluff support many rare plants including hay-scented fern, cinnamon fern, black chokeberry, *Bartonia virginica*, and closed gentian. Dry ledges on the south side of the bluff support small flowered rock-pink, prickly pear cactus, and other distinctive plants of sandstone ledges of the Shawnee Hills. The rare and beautiful firepink occurs throughout the preserve.

KANKAKEE COUNTY--Kankakee River Nature Preserve (24 acres)

Location: Six miles northwest of Kankakee. An island in the Kankakee River known as Langham or Altorf Island. Part of Kankakee River State Park.
Character: Valley forest.

Special features: This preserve has the only known naturally occurring population of the Kankakee mallow, *Iliamna remota*.

Management and use: Access and use is limited to protect the mallow.

LASALLE COUNTY--Starved Rock Nature Preserve (502 acres)

Location: South of the Illinois River, west of Route 178, and north of Route 71.

Character: Upland, ravine, and valley forests. Cliffs and canyons of the south bluff on the Illinois River. Ponds and some sand prairie in the river bottom and some small hill prairies. St. Peter sandstone outcrops in the east part of the preserve; other strata are present in the west part.

Special features: The cliffs and canyons provide spectacular scenery and habitats that support unusual plants including white pine and arbor vitae. The axis of the LaSalle anticline, one of the main structural features of the State, passes through the preserve in the vicinity of Little Rock, a prominent outcropping on the river bank.

Management and use: Because of poor access and the intermixture of State and private land, the area has suffered from abuses and encroachments over the years, including unauthorized farming, hunting, dumping, earthmoving, walnut theft, and private recreational development and use. A club maintains a private archery range within the preserve. These unauthorized uses should be terminated. This preserve has excellent potential for hiking use by visitors to Starved Rock State Park.)

Owner and custodian: Department of Conservation, Division of Parks and Memorials.

LAWRENCE COUNTY--Robeson Hills Nature Preserve (120 acres in two parcels)

Location: Northwest of Vincennes, Indiana, along the Wabash River on both sides of U.S. Route 50.

Character: Upland forest. A mature beech-maple forest on deep loess soils overlooking the Wabash River. Robeson Hill is a prominent topographic feature of the Wabash River bottomlands.

Special features: The locally rare sessile-leaved trillium is found here along with mistletoe and other unusual species.

Management and use: Vincennes University manages the area as part of a larger outdoor laboratory and environmental education site. A master plan has been prepared for the nature preserve.

Owner and custodian: Vincennes University

LEE COUNTY--Franklin Creek Nature Preserve (96 acres)

Location: Two miles west of Franklin Grove, north of U.S. Alt. 30.
Character: Upland forests and ravine forests, permanent stream, and bedrock outcrops of the Oregon Section of the Rock River Hill Country Natural Division of Illinois.
Special features: Several rock formations including New Richmond Sandstone, the oldest formation in the State; paw paw, yew, and other unusual plants present; several large springs.

MCLEAN COUNTY--Weston Cemetery Prairie Nature Preserve (5 acres)

Location: One-half mile east of the town of Weston, north of Route 24 and south of the Toledo, Peoria, and Western Railroad.
Character: Mesic prairie; dominant plants: big bluestem, Indian grass, little bluestem and prairie dropseed; typical prairie forbs include shooting star, wood betony, prairie violet, lead plant, compass plant, goldenrods, and asters.
Special features: This is a near-virgin "black-soil" prairie representative of the vast prairies that once covered Illinois. It is one of the few remnants of this vegetation left in the State.
Management and use: The cemetery is managed to maintain the prairie vegetation by Yates Township with the assistance of biologists from Illinois State University.

MARION COUNTY--Prairie Chicken Nature Preserve (160 acres; designated as the Illinois Natural History Survey Sanctuary)

Location: Southeast of Kinmundy.
Character: history of preservation, and management and use: See Jasper County Prairie Chicken Nature Preserve.

MASON COUNTY--Henry Allan Gleason Nature Preserve (110 acres)

Location: Three miles north of Topeka.
Character: Sand prairie, dunes, and blowouts; includes a 60-foot high sand hill known as Devil's Tower.
Special features: This is the only Illinois site for bladderpod (*Lesquerella ludoviciana*). Prickly-pear cactus and spiderwort are plentiful and present a colorful flowering display.
Owner and custodian: Department of Conservation, Division of Forestry; the preserve adjoins Mason State Forest and is managed in conjunction with it.

MASON COUNTY--Reavis Nature Preserve (53 acres)

Location: Two miles northwest of the confluence of Salt Creek and the Sangamon River.

Character: Loess hill prairie and forest. Little bluestem and side-oats grama are the dominant prairie grasses with many other grasses and forbs present. Purple coneflower, prairie clover, tickseed, and lead-plant are especially conspicuous. In some areas scurf-pea is abundant. Oak-hickory forest grows on less exposed slopes and in the ravines. The hills are composed of glacial drift covered with a thick cap of loess and rise some 250 feet above the Sangamon River valley. The preserve is part of one of the largest hill prairies in Illinois.

Special features: Several rare prairie species are found on the preserve, including white aster (*Aster ptarmicoides*) and ladies tresses orchid (*Spiranthes magnicamporum*). Notable wildlife includes the western hognose snake and glass snake.

Management activities: Periodic burning is being used to maintain the hill prairie. The area is used by ecology classes from the University of Illinois and other colleges and universities.

History of preservation: The area was used for pasture for many years. The tract was acquired by the State with the assistance of the Natural Land Institute. The hill prairie has been known and used by scientists and school groups for many years. It was studied and described by Dr. Robert A. Evers in *Hill Prairies of Illinois*, 1955.

MASON COUNTY--Sand Prairie-Scrub Oak Nature Preserve (1,460 acres, nature preserve; 40 acres, experimental area)

Location: Nine miles south of Havana, between Bath and Kilbourne.

Character: Forest, prairie, and dunes. The vegetation includes scrub forest of blackjack oak, sand prairie, and associations of unstabilized sand and old field.

Management and use: The area is used primarily for research.

Owner and custodian: Department of Conservation, Division of Forestry.

MASSAC COUNTY--Helesia Nature Preserve (18 acres)

Location: 4 miles west of Metropolis.

Character: Natural area located on an industrial site along the Ohio River; includes part of the floodplain of Rocky Creek with some silver maple forest; second growth oak-hickory forest; lightly grazed and cut in the 1960's.

Special features: Many rare plants; rich forest vegetation.

MASSAC COUNTY--Mermet Swamp Nature Preserve (43 acres)

Location: Two miles south of Mermet at the southeast corner of Mermet Lake Conservation Area.

Character: Forests and swamp. The vegetation includes near-virgin forest of pin oak-sweet gum-swamp white oak at the west end, a second-growth community of cypress-swamp cottonwood-pumpkin ash in the swamp, and a second-growth stand of white oak-red oak on slopes. The dominant shrubs in and around the swamp are buttonbush and Virginia-willow.

Special features: Styrax americana, Peltandra virginica, white basswood, and red iris are some of the unusual plants found on this area.

MONROE COUNTY--Fults Hill Prairie Nature Preserve (373 acres)

Location: One mile east of the village of Fults, which is 25 miles south of Belleville.

Character: Ravine forest, upland forest, hill prairie, river bluffs, bedrock outcrops, intermittent streams, sinkhole ponds and prairie marsh.

Special features: Unusual plants and animals include Rudbeckia missouriensis, Galium virgatum, Heliotropium tenellum, plains scorpion, coachwhip snake, flatheaded snake, Great Plains rat snake, and narrow-mouthed toad.

OGLE COUNTY--Beach Cemetery Prairie Nature Preserve (2.25 acres)

Location: Ten miles south of Rockford and two miles northwest of Holcomb on Big Mound Road.

Character: Dry prairie on a gravel kame; this pioneer cemetery has had only a few burials, all of them more than 100 years ago.

Special features: There is a rich assemblage of prairie species in this small tract, including such unusual species as prairie smoke, pasque flower, golden alexanders, and prairie dandelion (Agoseris cuspidata).

Management and use: The Ogle County Historical Society and Big Mound Cemetery Association have studied the history of the cemetery which dates back to 1869. The area is used by students from Northern Illinois University and nearby schools.

Owner and custodian: Natural Land Institute, Rockford, and Pine Rock Committee of Northern Illinois University, Taft Field Campus, Oregon.

OGLE COUNTY--Castle Rock Nature Preserve (589 acres)

Location: Four miles southwest of Oregon, along Route 2 on the west side of the Rock River.

Character: Mesic ravine forest, dry upland forest, floodplain forest, dry prairie, creek, sandstone cliffs and bluffs, marsh, and springs. The forests of the upper slopes and ridges consist of black oak, white oak, and hickory. In the deep ravines the forests are white oak, red oak, and butternut with witch hazel in the understory. Little bluestem and June grass are the dominant grasses of the dry prairie remnants, which also contain leadplant, western sunflower, and other forbs.

Special features: Many rare plants are found in the ravines, including rock selaginella, shining clubmoss, ground pine, ground cedar, long beech fern, broad beech fern, showy orchids, and yellow lady's slipper. More kinds of ferns are present than in any other northern Illinois location. Both the veery and the Kentucky warbler breed in the area, the former at the southern limit of its range and the latter near the northern limit of its range.

OGLE COUNTY--Pine Rock Nature Preserve (59 acres)

Location: Four miles east of Oregon on Route 64.

Character: Forest, prairie, and St. Peter sandstone outcrop. The vegetation includes black oak forest on uplands and mesic and wet prairie and some boggy areas on the lowlands.

Special features: Many uncommon plants are present, including rock selaginella, royal fern, purple cliffbrake, yellow-eyed grass, Turk's-cap lily, grass pink orchid, green fringed orchid, nodding ladies' tresses, and fireweed. The ornate box turtle and the lark sparrow are present.

Management and use: Northern Illinois University has a management committee for Pine Rock with headquarters at Taft Field Campus, Oregon. A study of the plants and animals in the area has been published and a master plan is in preparation.

Owner and custodian: Northern Illinois University, DeKalb, Illinois.

PEORIA COUNTY--Forest Park Nature Preserve (90 acres)

Location: North of Peoria, west of the Illinois River, between Routes 29 and 88.

Character: Valley and ravine forests; rugged river bluff area with mature hardwood forest.

Special features: Chase aster, an endemic occurring in only three Illinois counties, is abundant on the preserve.

Management and use: Sommer House, a nature center constructed by Forest Park Foundation, is in the portion of Forest Park that adjoins the nature preserve. It is operated as an outdoor education facility by the Peoria School District. This facility receives intensive use with about 10,000 persons visiting per year in connection with organized activities as well as many casual visitors.

Owner and custodian: Forest Park Foundation, owner; Peoria Park District and Forest Park Nature Center, custodian.

POPE COUNTY--Cretaceous Hills Nature Preserve (240 acres)

Location: Five miles southwest of Bay City.

Character: Upland forest, seep springs, and dry gravel knobs.

Special features: Unusual plants of the acid seep springs include cinnamon fern, marsh fern, and royal fern. Notable plants of the dry woodlands are Hypericum denticulatum, Lechea villosa, and dwarf crested iris.

POPE COUNTY--Lusk Creek Canyon Nature Preserve (125 acres)

Location: Four miles northeast of Eddyville.

Character: Forests, permanent stream and bedrock outcrops. The forests are sugar maple-beech-tulip tree in valley bottoms, white oak-red oak-hickory on slopes, and blackjack oak-post oak-scarlet oak on blufftops.

Special features: The principal feature is a deep gorge eroded through Pennsylvanian sandstone (Caseyville Formation) by Lusk Creek. The gorge is very scenic and supports relic northern plants including three species of clubmosses on its north-facing walls. The hay-scented fern and at least 13 kinds of native orchids occur here. At least 13 kinds of lichens are known in Illinois only from this area. There is a stone wall built by Indians during the Archaic Period.

PUTNAM COUNTY--George S. Park Nature Preserve (80 acres)

Location: Two miles northeast of the intersection of Routes 18 and 26.

Character: Old-growth upland and ravine forest; mixed deciduous forest, containing basswood, white oak, red oak, bur oak, and shagbark hickory, with an understory of hard maple, hop hornbeam, and redbud; wildflowers, ferns, and shrubs are abundant.

Special features: Goldenseal, the yellow-flowered form of the purple trillium, and showy orchids are some of the more unusual and attractive plant species present. Two rare species of beetles have been found here.

PUTNAM COUNTY--See Bureau County

Miller-Andersen Woods Nature Preserve

RICHLAND COUNTY--Big Creek Woods Memorial Nature Preserve (40 acres)

Location: Two and one-half miles south of Olney on Route 130.

Character: Ravine forest; vegetation is second-growth dry to mesic forest. There is a permanent stream.

Owner and custodian: Illinois Chapter, The Nature Conservancy, 708 Church Street, Evanston, Illinois, and Olney Central College, Olney, Illinois. The preserve is used by Olney Central College as an area for education and research.

UNION COUNTY--Ozark Hills Nature Preserve (222 acres)

Location: Within the southern part of Trail of Tears State Forest, five miles northwest of Anna, between the main park road and a lookout tower road.

Character: Dry upland forest, mesic ravine forest, bedrock outcrops, and Ozark plants. Vegetation consists of a relatively mature second growth forest dominated by black oak, white oak, and hickories on dry upland sites and beech, tulip tree, white oak, sugar maple, and cucumber magnolia in the mesic ravines. Sweet gum is frequent in some of the larger ravine bottoms. The tract is representative of the strongly dissected upland with narrow ridges and deep ravines found on the eastern slope of the Ozark uplift in Illinois. Bedrock of the lower Devonian system is exposed in some of the stream beds.

Special features: Several rare or uncommon plant species are present including wild azalea, red buckeye and cucumber magnolia. Very small remnants of hill prairies also occur. Wildlife present includes a good population of wild turkey.

VERMILION COUNTY-Russell M. Duffin Nature Preserve (160 acres)

Location: In Forest Glen Preserve, 9 miles southeast of Danville and 6 miles northeast of Georgetown on the south bank of the Vermilion River.

Character: Mesic ravine forest and dry upland forest. The forest includes red oak, sugar maple, beech, and tulip tree in the ravines and white oak, black oak, and hickory on the ridgetops.

Management and use: Field trips into the preserve are coordinated through the Willow Shores Nature Center, an outdoor educational facility operated by the Vermilion County Conservation District.

WABASH COUNTY--Beall Woods Nature Preserve (290 acres)

Location: On the Wabash River, five miles south of Mt. Carmel, east of Keensburg, and just north of Rochester.

Character: This is a unique near-virgin forest with a great variety of trees, including a number of record size. Both bottomland and upland forests are represented. Eleven kinds of oaks and six kinds of hickories are among the species present.

Management and use: Five foot trails and one foot bridge are the only developments in the preserve. All trails start at the Red Barn Nature Center, on State land adjoining the preserve, where visitors are oriented. A trail guide leaflet is available.

WHITESIDE COUNTY--Thomson-Fulton Sand Prairie Nature Preserve (53 acres)

Location: Two miles south of Thomson, in the northwest corner of Whiteside County, between the CB&QRR right-of-way and the Mississippi River navigation pool.

Character: Sand prairie, dunes, and blowouts of the Mississippi River Section of the Illinois River and Mississippi River Sand Areas Natural Division of Illinois.

Special features: Prickly-pear cactus and the western harvest mouse are among the noteworthy species present.

Management and use: The State holdings are an adjunct to a larger area held by the U.S. Corps of Engineers and the U.S. Fish and Wildlife Service. Tentative arrangements have been made to preserve the entire area for educational and scientific use. The Department of Conservation has leased an additional 26 acres of prairie on the right-of-way of the abandoned CB& QRR.

Owner and custodian: Department of Conservation, Division of Parks and Memorials.

WINNEBAGO COUNTY--Harlem Hills Nature Preserve (53 acres nature preserve; 1 acre undedicated holdings)

Location: East of Route 173 and south of Nimtz Road; one mile southwest of Rock Cut State Park.

Character: Gravel hill prairie. Dry upland prairie dominated by little bluestem, northern dropseed, and sideoats grama in the higher areas and a wide variety of secondary species. Indian grass is common on lower slopes and in draws. Part of the eroded till plain on the edge of the Rock River valley.

Special features: The spring displays of pasque flower and shooting star are notable. Among the rare plants are *Zizia aptera* and *Ranunculus rhomboideus*.

Management problems and needs: The area is becoming surrounded by residential development. A severe problem of trespass by automobiles, motorcycles, snowmobiles and horseback riders has been brought under control by the fence construction. However, neighboring children and automobile-borne youths will cause further damage unless additional protective measures are taken. Use of the preserve for play by neighboring children causes some destruction of vegetation and harassment of wildlife.

History of preservation: The area has not been grazed since prior to 1950. About 10 acres of the area was plowed at some time, probably more than 50 years ago. The prairie was studied in the early 1950's by Dr. Egbert W. Fell.

WINNEBAGO COUNTY--Rockton Nature Preserve (67 acres)

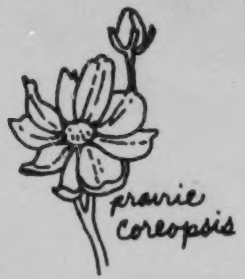
Location: Three miles northwest of Rockton and three miles west of South Beloit.

Character: Sedge meadow, wet and mesic prairie, marsh and forest of the Winnebago Section of the Northeastern Morainal Natural Division of Illinois. The area is predominantly sedges, cordgrass, bluejoint grass, and cattails with some areas dominated by shrubs such as willows, dogwoods, dwarf birch, and black chokeberry.

Special features: Many prairie and wetland plants occur, including cinnamon fern, royal fern, Triadenum fraseri, Indian paintbrush, blue-leaf willow and prairie blazing star.

Owner and custodian: Department of Conservation, Division of Parks and Memorials.

Prairies

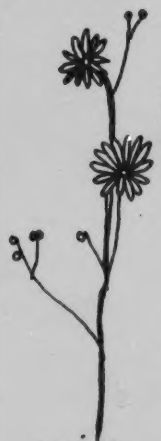


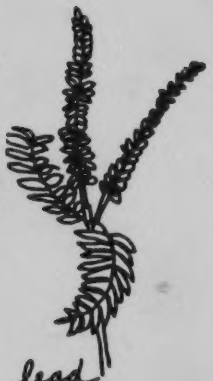
Recent studies indicate that almost 80 per cent of Illinois was once covered by a luxuriant growth of tall grasses and wildflowers called by the first French explorers "prairies". Today less than one-half of one per cent of the original prairies remain recognizable as part of the Illinois heritage.

Farmers initially destroyed prairies. Later, expansion of the commercial and industrial areas in Illinois eliminated prairies along with the elk, bison, plains wolf, and prairie chicken that lived there. The import of these changes is that the colorful prairie is sensitive to the influence of people while people are ignorant of or insensitive to the prairie's vitality and diversity. The continued existence of prairie species in Illinois, such as bluestems, puccoons, paintbrush, orchids, gentians, and lilies, depends not on the efforts of a few naturalists but on the concerted actions of the people of Illinois who really want them. The Illinois prairie, as one of the few "glamour" ecosystems extant in the U.S., represents a unique indicator of humans' successful coping with the environment to provide a good quality of life.

Today community education, understanding, and action are urgently needed to keep the nickname "prairie state" from becoming an obscure footnote in the history of Illinois.

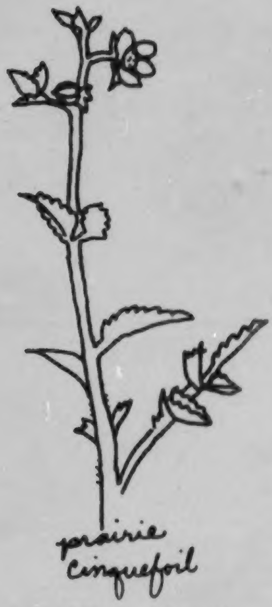
by Louis P. Mule
Instructor, Prairie Workshop
National College of Education





Shut your eyes and try to picture the vast open expanses of grasses and flowering plants that once covered this part of our country. These prairies probably existed here for thousands of years. Actually, prairies, or grasslands, have covered large areas in many parts of the world. At one time about one-fourth of the entire planet was covered by grasslands. Such lands receive less rainfall than the forested land and are subject to drier winds. In Illinois the prairie areas were mixed with areas of forest, mostly oak and hickory, in the upland areas. These groves were called "oak openings". Here bur oaks, the tallest of the oaks, reached heights of 150 feet or more. These oaks have a thick, fire-resistant bark which enabled them to withstand the prairie fires.

Compare soil profiles of a deciduous forest and a tallgrass prairie.

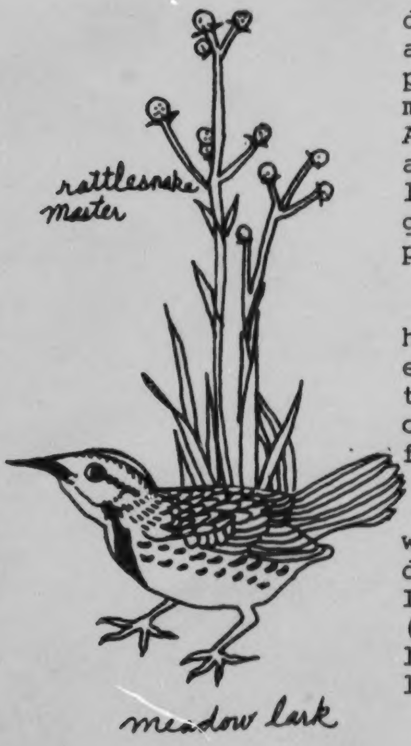


The prairie was the habitat of a very rich variety of plants and animals. Each species of living thing played a role, occupied its own niche in the community--a general characteristic of communities. The prairie was a stable community, composed mostly of perennial plants. The grasses and other species were long-lived, an individual plant lasting from ten to twenty years or more. The grasses had deep, well-developed root systems, some of which penetrated 15-20 feet, with up to 75 percent of the total bulk of the plant below ground! These deep roots made it possible for the prairie plants to survive dry periods, extremes of climate, and prairie fires--but they could not survive the steel plow and heavy grazing which came with the settlers and which caused the prairie to be replaced by crops and by weeds from Europe and Asia.

Learn more about the dependence of the Plains Indians on the buffalo.

Learn about the prairie food pyramids.

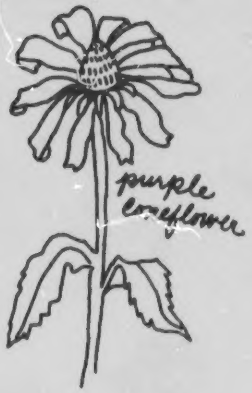
Not all prairies were alike. The group of species which inhabited a particular site was determined by many variables. Chief among these variables were the general soil characteristics and the soil moisture. Prairie soils ranged from heavy black loam rich in decayed plant material (humus) to light soils which were predominantly sand, with many gradations between. Special soil conditions resulted where limestone, rocks, or other materials were found.



The several kinds of prairies are: mesic, high, dry, low, marsh, and alkaline fen. Most of the rich agricultural sections of Illinois were once mesic prairie. This type of prairie was found on moderately moist land which was usually level or somewhat rolling. A few indicator plant species, i.e., species which are conspicuous and more restricted, of mesic prairie land are prairie dock, compass plant, big bluestem grass (which reached 6-10 feet or more), purple prairie clover, and purple coneflower.

The high, dry prairies occurred, of course, on high, well-drained hills and ridges. Because of erosion the soil was less rich and black than that of the mesic prairies. Species indicative of this type of prairie included little bluestem grass (up to 2 feet tall), side-oats grama grass, and silky aster.

The low prairie occupied poorly drained areas which were often very wet in spring and frequently dry by fall. The dominant plants were the sedges. Indicator species here were cord grass or sawgrass (the grass cut and used for roof thatching on early log cabins), marsh blazing star, and glaucous white lettuce.



Where the land was wet and soggy or covered by water for most of the year prairie marshes were found. These prairies were recognized by swamp milkweed, blue joint-grass, and boneset.

An alkaline fen is a type of prairie marsh or wet prairie which "has an internal flow of alkaline waters, usually cold and rich in calcium and magnesium salts...The ground water percolating down through a hill and out onto the lowland dissolves the calcium and magnesium out of the limestone, giving the water its alkaline character".* Plants indicative of this kind of prairie are grass-of-Parnassus and Ohio goldenrod.

Butterflies, bumble bees, and many other insects--beetles, aphids, moths, wasps, hornets, and others, as well as their larvae in the form of grubs and caterpillars--were part of the world of the prairie. Ants played a very important role in vertically working prairie soils, often to depths of 9 to 10 feet. Such action, stretched over the formation of prairies, a time span of eight to twelve thousand years, became very significant. Spiders, too, were part of prairie life.

The climax prairie community included many small vertebrates. Ground squirrels, badgers, foxes, moles, and pocket gophers loosened and aerated the soil as they dug their tunnels. Mice were everywhere. Seed and fruit eaters themselves, they were food for many of the birds, snakes, and other prairie animals. Illinois prairies were in the heart of some of the best white-tailed deer ranges in North America. Even larger mammals, bison and elk, roamed the prairies of the Midwest. One can easily see what the concept, "flow of energy" means when applied to the prairie community. For example, frogs and salamanders ate insects and in turn were eaten by snakes and birds, which were eaten in turn by other animals. All died and were returned to the land.

Birds of the high prairie included the prairie chicken, marsh hawk, short-eared owl, meadow larks, horned larks, bobolinks, several kinds of sparrows, upland plover (upland sandpiper), killdeer (a kind of plover), and cowbirds. The latter followed the buffalo and later the cattle, picking up insects stirred by the animals' hoofs as well as eating ticks and other insects as they perched on the backs of the animals. In the low, wet prairies, marsh wrens, red-

Did you know--
--that wolves fed on overage and ailing bison, thus improving the quality of the herd?
--that men who hunted bison selected the vigorous young animals and the cows, thus depleting the herds?

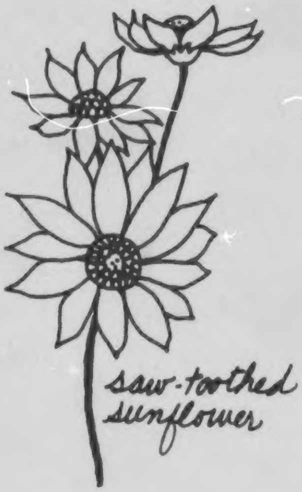
It is estimated that when the white men came to this continent, 30-60 million bison roamed the prairies. By 1870 the number had been reduced to 5 1/2 million, and by the early 1880's only a few hundred were left.

---

*Prairie Plants of the Chicago Region by Robert F. Betz. Morton Arboretum, 1965. Out of print. p. 13.

winged blackbirds, many kinds of ducks, sandhill cranes, rails, and a few other species flourished.

Nowhere today is there a prairie plant-animal community as it existed in early times. Some of the creatures have died out completely. Long ago, bison roamed the prairies as far east as Pennsylvania, but were exterminated in most areas by excessive hunting, the last great bison herds of the western plains disappearing in the 1880's. Mass killings for the hides, with the rest of the animal left unused, led to virtual extinction. Prairie chickens have also disappeared.



Regular burning does not harm prairie grasses, but it does kill the sprouts and seedlings of trees and shrubs that might take over. "Thus, the tall grass prairie is a grassland in a forest climate, maintained by fire."* Prairie plants can grow again from their roots the following season.

Have these vast prairie areas completely disappeared? Not completely--but very little of original prairie is left. Now a rare and vanishing community, a few prairie remnants are being protected and set aside for study. There are also man-made prairies in restoration projects. Camp Sagawau in Cook County Forest Preserve and the Morton Arboretum in Lisle have restored prairies, and a prairie project of some 800 acres was started in 1974 at the Fermi National Accelerator Laboratory in DuPage and Kane Counties, near Batavia. You may be able to find out about other projects.

You may wonder if it is possible to visit a prairie. Because of the fragile nature of these ecosystems, most small native prairie remnants cannot be opened to the public or to large groups, but fortunately for those of you who would like to experience a prairie, there are some you can visit. These are described in the list on the following yellow page.

In some areas of Illinois, local citizens have cooperated with the Open Lands Project in Chicago and the Illinois chapter of the Nature Conservancy in Evanston to save prairie remnants. If you are interested in working with such a group, phone Open Lands Project (312) 427-4256, or the Nature Conservancy (312) 864-4493, to learn what groups are working currently to save a prairie remnant.

---

*The Life of Prairies and Plains by Durward L. Allen. Published in cooperation with the World Book Encyclopedia. McGraw-Hill, 1967. p. 19.

The prairie changes continuously during the seasons. To gain a true appreciation for a prairie, you should visit it in spring, summer, and fall to become familiar with the different seasonal aspects. Generally, each kind of prairie flower blooms for about two weeks, providing color from late April through early November. Perhaps by visiting you can imagine what the vast prairie areas were like.

pasqueflowers

NOTE: Information on the types of prairies and their indicator species was obtained from Prairie Plants of the Chicago Region by Robert F. Betz. Morton Arboretum, Lisle, Illinois. 1965. Out of print.

THINGS TO DO:

- Visit a Prairie
- Start your own mini-prairie in your yard or on a schoolground. Write Windrift Prairie Nursery, R.D. 2, Oregon Illinois 61061 for Seed List.

BOOKS TO ENJOY:

Allen, Durward L. The Life of Prairies and Plains. McGraw-Hill, 1967. Junior high to adult.

*Korling, Torkel. Prairie: Swell and Swale. Dundee, Ill. 1972. Includes essay by Dr. Robert F. Betz, Professor of Biology at Northeastern Illinois University.

Rock, Harold W. Prairie Propagation Handbook. 1974.

*Can be obtained for $3.95 from:
Open Lands Project, 53 W. Jackson, Chicago, Illinois 60604
Morton Arboretum Bookshop, Route 53, Lisle, Illinois 60532

Workshops on prairies have been held in northern Illinois. If you would like information on any future workshops write to:

Douglas E. Wade
Lorado Taft Campus
Northern Illinois University
Oregon, Illinois 61061

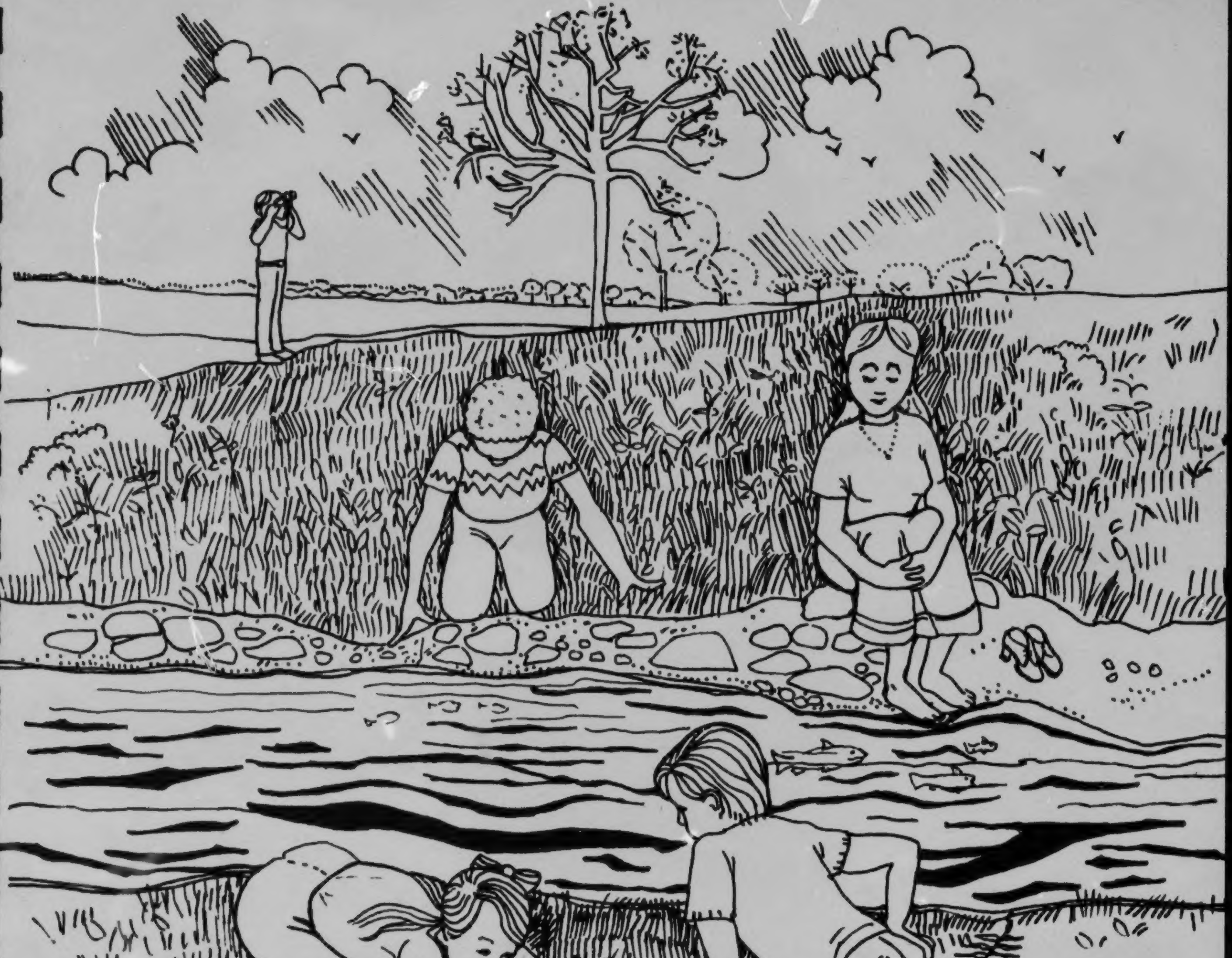
He will send you information when it is available.

Prairies

Prairies

Grundy County	Goose Lake Prairie Nature Preserve-- North of Lorenzo Road, Halfway between Morris and U.S. 66 dry, mesic, and wet prairie
Hancock County	Mississippi R. Sand Hills Nature Preserve one-half mile east of Warsaw, south of Great River Road sandy hill prairie; hilltops have little bluestem and other species
Jasper County	Jasper County Prairie Chicken Nature Preserve north and east of Bogota mesic prairie farmland
Johnson County	Heron Pond - Wildcat Bluff Nature Preserve four miles south-southwest of Vienna little bluestem and side-oats grama dominant in limestone glade
LaSalle County	Starved Rock Nature Preserve--south of the Illinois River, west of Route 178, north of Route 71 sand prairie in the river bottom and some small hill prairies
McLean County	Weston Cemetery Prairie Nature Preserve one-half mile east of the town of Weston, north of Route 24 and south of the Toledo, Peoria, and Western Railroad mesic prairie--dominant plants are big bluestem, Indian grass, little bluestem, and prairie dropseed; typical prairie forbs include shooting star, wood betony, prairie violet, lead plant, compass plant, goldenrods, and asters near-virgin "black-soil" prairie representative of the vast prairies that once covered Illinois
Mason County	Henry Allan Gleason Nature Preserve three miles north of Topeka sand prairie Sand Prairie-Scrub Oak Nature Preserve nine miles south of Havana between Bath and Kilbourne sand prairie

Monroe County	Fults Hill Prairie Nature Preserve one mile east of the village of Fults, 25 miles south of Belleville hill prairie and prairie marsh
Ogle County	Beach Cemetery Prairie Nature Preserve ten miles south of Rockford and two miles northwest of Holcomb on Big Mound Road dry prairie on a gravel kame; rich in prairie species such as prairie smoke, pasque flower, golden alexander, and prairie dandelion Castle Rock Nature Preserve four miles southwest of Oregon, along Route 2 on west side of Rock River dry prairie with little bluestem, June grass, western sunflower, lead plant Pine Rock Nature Preserve four miles east of Oregon on Route 64; mesic and wet prairie managed by Northern Ill. Univ., Taft Field Campus
Whiteside County	Thomson-Fulton Sand Prairie Nature Preserve two miles south of Thomson, in the northwest corner of the county; between the Burlington Northern (CB & Q R.R.) right of way and the Miss. R. navigation pool sand prairie
Winnebago County	Rockton Nature Preserves Three miles northwest of Rockton and three miles west of South Beloit. wet and mesic prairie



THINGS TO DO:

Water:

- In any area with water, watch quietly for animal life at the edge of a lake, pond, or stream where they come for food and water.
- In a lake, look for insects on, over, or just below the surface of the water; you may see dragonflies feeding on mosquitoes; water striders or water boatmen; notice how they move and if possible what they eat.
- Try to trace the source of the water for a lake, i.e., try to determine the watershed that drains into the lake.

Swamps and Marshes: though many people do not realize it, the swamp is a living museum; it affords an environment where many plants and animals can live.

- Compare the dry soil of the surrounding higher land and the wet, spongy earth of the swamp itself.
- Compare the plants growing on the higher land with those that grow in the swamp.
- Notice the plants that grow on the three different levels of the marsh: on the bottom, under the water; with leaves floating on the surface of the water; and growing out of the water.
- Look for insects on, over, or just below the surface of the water.
- Look for frogs and turtles (amphibians); why are they here?
- Look for birds, especially during the fall and spring migrations.
- Look for signs that the wet land is gradually becoming dry land--plants on the shore gradually filling in the edge; clumps of grass forming islands in the swamp where tree seedlings may grow; notice that leaves and stalks of plants raise the level of the wet area as they decay.
- Look for evidence that the water level may have risen; i.e., dead trees with their feet in water.
- Look for the source of the water.
- After examining the swamp, consider: should the swamp be drained for development? (NOTE: the water supply of some cities comes from water that is stored or flowing underground; water held in marsh or swampland gradually seeps in and replenishes the underground water supply. The city of Madison, Wis., is now protecting marshes in its area because of importance to ground water and lake re-charging.

Woods:

- Notice the difference in how much light each plant receives.
- On a hot day notice the differences in temperature in shade and sun.
- Notice the texture of the forest floor and the leaves and twigs that are rotting.
- Look for animals or signs that they are nearby.
- Look for birds.
- Look on leaves, bark, rotting logs (and under it) for insects. (NOTE: Do not be destructive of rotting logs: roll them back in their former places.)
- Learn about the different levels of the forest--the canopy (the upper-most level), understory, shrub layer, herb layer, litter and soil; how would you describe them; what lives in each level?

Miscellaneous

- Send for kit about Blackwell Forest Preserve developed from an abandoned gravel pit to a recreation area with lakes and a hill made on a sanitary landfill; for free kit, write; Forest Preserve District of DuPage County, 881 W. St. Charles Road, Lombard 60148, or phone (312) 629-5700.
- Learn about food chains and food webs in a lake or swamp or woods.
- Learn about ways to attract wildlife--planting food, building brush piles, and so on.
- Learn about the Civilian Conservation Corps (CCC) of the 1930's.
- Groups can visit the Max McGraw Wildlife Foundation--on Route 25, south of Route 72, between Elgin and Dundee; from April 15-July 15 you can see hundreds of pheasants, turkeys, mallards, etc. in all stages of growth on the game farm; animals used for research by departments of conservation. Phone (312) 741-8000.
- Visit the Chicago Academy of Sciences, 2001 N. Clark St; 10 a.m. - 5 p.m. daily; admission free; geological and ecological exhibits of Chicago and Great Lakes region; free educational lectures and films on Saturday and Sunday in fall, winter, and spring; Jr. Academy of Sciences; free nature trips on Saturday mornings; phone 549-0606 for information.
- Visit Field Museum of Natural History, Roosevelt Road at Lake Shore Drive; many exhibits of animals; Admission $2.50 for families, $1 for adults, 35¢ for children (6-17 years), students and senior citizens; Fridays are free; open 9 a.m. to 4 p.m. Nov. through Feb., 9 a.m. - 5 p.m.

weekends; Open 9-5 March, April, Sept., Oct.; open 9-6 May to mid-June; 9-6 Monday, Tuesday, Thursday, mid-June through Labor Day; 9-9 Wednesday, Saturday and Sunday. Open 9-9 Friday year-round.

- Visit Pilcher Park Nature Museum--off U. S. 30 on the east side of Joliet--326 acres; woodlands,, 5 miles of nature trails, restored French fort, nature museum. Open Monday-Friday 10 a.m. to dusk; Saturday and Sunday noon to dusk. Guided tours for groups. Phone (815) 726-2207.
- Teachers may already know about the Field Museum's Raymond Foundation programs for school groups; especially pertinent to the topic in this chapter are the Science Workshops on Ecology and the Science Tour-Programs on Plants and Animals of the Chicago Region, Relationships Between Living Things (on ecology), and Vanishing Animals. For information write: The Raymond Foundation, Field Museum of Natural History, Roosevelt Road and Lake Shore Drive, Chicago 60605.
- Learn about the environmental education program for children and adults at the Field Museum of Natural History. The program includes workshops, field trips and courses--for adults, young people and family groups. An exhibit called "Man and His Environment" will open in 1975; watch for special programs in connection with this exhibit. For information on the programs, write to the Coordinator, Special Services, Department of Education, Field Museum of Natural History, Roosevelt Road and Lake Shore Drive, Chicago 60605.

(NOTE: See also Books and Materials listed in chapters on Green Growing Things Nearby, Living Things Around You, In a Vacant Lot.)

BOOKS TO ENJOY:

Busch, Phyllis; Exploring As You Walk in the Meadow. Lippincott, 1972.
Busch, Phyllis; At Home in Its Habitat. World, 1970. Intermediate grades. $5.
City of New York, Board of Education, Bureau of Curriculum Development; Operation New York; Using the Natural Environment of the City as a Curriculum Resource. Reprinted 1970. Available for $2.00 from Board of Education, City of New York, Publication Sales Office, 110 Livingston St., Brooklyn, N.Y. 11201. Make checks payable to Auditor, Board of Education.

Swan, Malcolm D. (editor); Tips and Tricks in Outdoor Education. Available from Interstate Printers and Publishers, Inc., Danville, Ill. 61832. $4.50.
Van Dersal, William R.; The Land Renewed. Henry Z. Walck, rev. 1968. intermediate. $5.

Lands Administered by Federal Government

Lands under U.S. Army Corps of Engineers

The water development program of the U.S. Army Corps of Engineers includes planning, constructing, and operating projects for flood control, navigation, beach erosion, and related water purposes. Because the projects are organized by river basins, they cross state boundaries. Thus, areas of Illinois are in districts with land in other states. Work done by the Corps on the Mississippi and Ohio rivers and the Illinois Waterway have made possible the great amount of barge and recreational traffic.

There are three large lake-reservoirs in Illinois which are Corps projects as well as many locks and dams along the Illinois waterway and other rivers. These reservoirs are: Carlyle Lake, Lake Shelbyville, and Rend Lake. (For locations of these lakes and of some of the locks and dams see the following yellow page.) In the reservoir areas, recreation of various kinds is available--camping, picnicking, fishing, hunting, boating, swimming, water skiing, hiking, and in some places wildlife-nature studies.

Carlyle Lake is part of the development of the Kaskaskia River basin for water supply, flood control, fish and wildlife conservation, recreation, and downstream water quality control. Six public access areas have been developed by the Corps plus four additional areas in Hazlet State Park on the west shore of the lake under the Illinois Department of Conservation. Of the 14,000 acres lying southwest of the Burlington-Northern Railroad, 8,000 form a refuge and 6,000 an open water shooting area. North of the railroad, the Department of Conservation manages a wildlife area of 12,000 acres called the flooded dead timber area. The Department has also developed South Shore State Park here.

Lake Shelbyville is also part of the development of the Kaskaskia River basin. This lake has about 250 miles of shoreline and more than 11,000 surface acres of water. Development of this area, too, is being done cooperatively by the Corps and Illinois Department of Conservation. The Department's management of about 6,000 acres of water and land in the upper areas of the lake includes stocking fingerlings of various sport fish as well as developing two state parks and four access areas. The Corps is developing 10 access areas.

Rend Lake, one of the newest multi-purpose projects in southern Illinois, has a conservation area of over 16,000 acres. Corps material indicates over 50 communities use this lake for their water supply; others benefit from the flood control, and countless people enjoy the recreational facilities. A waterfowl refuge and two subimpoundment areas (which are flooded for waterfowl during the hunting season after crops are grown for food) are managed intensively by the Department of Conservation. In the 5,000 acre refuge, crops of corn, millet, and milo, and green forage of winter wheat and clover are grown to provide adequate food for migrating waterfowl. Rend Lake State Park is on the east central shore of the lake.

Many of the Corps' projects are controversial. Concerned individuals and groups, as well as farmers who are displaced, object to their projects, frequently testify against them, and offer alternatives. These people argue against Rend Lake, Lake Shelbyville, and Carlyle Lake, for example, by saying that:

- good agricultural land, which is sorely needed to grow food, is permanently taken out of production
- faulty arguments were presented about the economic benefits, i.e., industry has not come as indicated
- the reservoirs have covered beautiful land along the rivers; the flood control program results in mud flats part of the year
- the water quality in the lake is affected by fertilizer from upstream farmland
- occasional flooding is caused downstream, though flood control is one of the main justifications for the projects
- the land, which becomes federal land, is taken out of the local tax base
- social pressures have increased in nearby communities, i.e., some municipalities built classrooms and sewers to handle the increased population, which lasted 2-5 years during the construction, and the communities continue to pay for these additional facilities
- farmers who are displaced find it difficult or impossible to find other farms they can afford;
- when they move, they are usually too far from their church and social group
- nearby towns often have increased traffic and commerce on weekends which strain the local resources, perhaps necessitating a larger police force and additional town employees of other kinds, and not generating revenue for the town.

Corps projects sometimes involve channelization (straightening) of streams. Those who object point out that channelization results in water being carried away more quickly, thus causing flooding problems downstream.

There are also objections to the limited public access to the water. In sections of the shoreline of the lakes, the Corps has put in giant white rocks which are dangerous for climbing and result in access to the water being limited to public access points for those with boats. Hikers and fishermen are virtually excluded from the shoreline.

The argument is often given that trade-offs have to be made. Farmland has to be lost to provide large-scale recreational areas, flood-control projects, and water supplies. The negative aspects of Corps activities have been widely publicized recently. Few people realize that the military's involvement in civil works began during the last century when the Corps was given the task of opening the Midwestern river system so that farm products could be shipped to the East coast and foreign markets. The skills developed on work on the Mississippi River were instrumental in the construction of the Panama Canal--a task at which the French builder, Ferdinand deLesseps of Suez Canal fame, had failed. The organizational know-how and the construction competence of the Corps were important factors in the monumental task of constructing a world-wide system of bases which supported Allied forces during World War II.

It is important to note that the Corps is responsive to the Congress which provides its civil works monies. In recent years our lawmakers have heard the arguments of citizens who want to "save" as well as those who want to "build". The Corps' flood plain management program is a non-structural activity which has been highly successful in avoiding flood damages. However, despite its environmental interests and responsibilities, the Corps has difficulty in pleasing citizens on various sides of an environmental issue. For example, are they to allow the rivers and harbors that have been built over the past century to fill in with silt? Or are they going to find some way to lessen the environmental impact of dredging? They have taken the latter course, but the task has been difficult and costly. The Corps' giving serious consideration to the environmental aspects of their projects reflects not only the directives of Congress but also the constructive input from local citizens who participate in the public hearings which have been for many years an important part of each project. If any public hearings are held in your area, you may want to attend and participate.

THINGS TO DO:

- Study migrating waterfowl at one of these areas.
- Contact the Illinois Department of Conservation, Division of Wildlife Resources, State Office Building, Springfield, Il. 62706, to get information on their fish, waterfowl, and wildlife management programs.
- Teachers might want to contact the Corps headquarters at each of these lakes to learn what kind of help they can offer and what activities are best suited to these areas.
- Ask residents of towns closest to the lakes how the lake has affected their area and their lives; determine whether the effects have been economic, quality of life, other, or a mixture.
- Try to find someone who once farmed land flooded by a Corps project; discuss the situation; is he still able to farm?
- Consider the impact on the local communities of a large weekly influx of visitors seeking weekend recreation from spring through fall.
- Try to determine the economic impact of the reservoir: has industry come to the area? Were local people hired during the construction or did skilled construction workers come from a distance and stay temporarily, putting a temporary burden on the area?
- Learn more about the advantages and disadvantages of locks and dams.
- Attend a public hearing for a project in your area. Try to understand the issues. Speak up at the hearing or write a follow-up letter to the District Engineer expressing your views.
- Watch for news articles that object to "pork-barrel" projects in other areas but support similar projects for their own district.

For information on:

Carlyle Lake
Lake Shelbyville
Coon Creek Nature Trail--
1/2 mile, self-guiding
Rend Lake

write to:
U.S. Army Corps
of Engineers
St. Louis District
210 N. 12th Street
St. Louis, Mo.
63101

BOOKS TO ENJOY:

American Rivers. Bimonthly publication. Order from Coalition of American Rivers, Box 2667, Station A, Champaign, Il. 61820. $5/year.

An Engineering Victory for Our Environment. A Citizen's Guide to the U.S. Army Corps of Engineers, by The Institute for the Study of Health and Society for the U.S. Environmental Protection Agency, 1971. U.S. Governmenting Printing Office. $3.00.

PROJECTS DEVELOPED AND ADMINISTERED BY THE U.S. ARMY CORPS OF ENGINEERS

Carlyle Lake and reservoir--on the Kaskaskia River; east and north of Carlyle and southwest of Vandalia; south of Route 70 and west of Route 51

Lake Shelbyville--on the Kaskaskia River northeast of Shelbyville, west of Mattoon, and southeast of Decatur; east of Route 128, west of Route 32

Rend Lake--on the Big Muddy River; south of Mt. Vernon and northwest of Benton; west of Route 57

Some of the Locks and Dams along the Illinois Waterway

Brand Road lock and dam--DesPlaines River--Joliet
Chicago River lock--at entrance channel from Lake Michigan--Chicago
Dresden Island lock and dam--Illinois River--southwest of Channahon
LaGrange lock and dam--Illinois River--near Beardstown
Lockport lock--Sanitary and Ship Canal--Lockport
Marseilles dam--Illinois River--Marseilles
Marseilles lock and canal--Illinois River--Marseilles
Peoria lock and dam--Illinois River--Peoria
Starved Rock lock and dam--Illinois River==near Ottawa

Indiana Dunes National Lakeshore

NOTE: Although the Indiana Dunes National Lakeshore is outside of northeastern Illinois, it is so accessible and so important an area, that information has been included in this book.

> "The Dunes are to the Midwest what Grand Canyon is to Arizona and Yosemite is to California. They constitute a signature of time and eternity..."
>
> Carl Sandburg

The field of ecology, so important today, had its beginnings at the Indiana dunes. This science that deals with the interrelationships between living and non-living things grew out of the work of Dr. Henry Chandler Cowles of the University of Chicago and his students, who developed during the years 1896-1933 the ecological concept of plant succession.

The Indiana Dunes National Lakeshore is located in Indiana at the southern tip of Lake Michigan between Gary and Michigan City in what is called the Calumet Region. Before 1900 this Region was a "vast network of bogs, wet prairies, and marshes abundant with wild fowl and fur-bearing animals. Today it is one of the leading industrial regions of the world. Beginning at the Port of Indiana...this industrial complex includes some 200 industries manufacturing over 1,000 products."* It stretches westward for 35 miles almost without interruption until it reaches Chicago.

As long ago as 1916, the first director of the National Park Service recognized the unique character of these dunes and proposed a 13,000 acre Sand Dunes National Park. Nothing came of this proposal. In 1923, the State of Indiana, however, established the Indiana Dunes State Park in this area. Decades later--in 1952--concerned individuals formed the "Save the Dunes Council" and began to work with other conservation and citizen groups for the creation of a national park to preserve and protect these dunes. Due in large part to the years of work by these groups, the Indiana Dunes National Lakeshore was established by Congress in 1966. This national park contains about 13 miles of shoreline and 8,330 acres of dune lands which include 2,200 acres located within the Indiana Dunes State Park.

*Indiana Dunes National Lakeshore. An Overview. Department of the Interior, National Park Service, Indiana Dunes National Lakeshore. 1973. pp.2-3.

Industrial and residential development surround the National Lakeshore. The variety of land uses in the area include private year-round and summer residences, railroads, highways, utility rights-of-way, sand mining, major industrial complexes, and mixed small commercial enterprises.

The National Lakeshore area is unique. Actions of glaciers, wind, and water have resulted in an area of fascinating variety--sand dunes, marshes, swamps, bogs, white sand beaches, and widely diversified flora and fauna. The wide, gently-sloping beaches vary from less than 10 feet to 50 feet in width. Adjoining the beaches and extending as far as a mile inland, sand dunes form valleys and ridges close to 200 feet high.

The area is a meeting place of northern and southern plants with over 1,000 different species of flowering plants and ferns. The region is an outstanding scientific laboratory for botanists, biologists, ornithologists, and geologists as well as curious individuals who wish to learn a little more about the wonders of the area. The varied fauna include:

- salamanders, reptiles, birds, and insects in the bogs and marshes
- between 250-300 species of birds--residents, migrants, and summer and winter visitors
- more than 40 mammals including deer, fox, raccoon, and beaver.

As a result of its geographic position, the area has had trails and roads since early times. These routes were used by Indians, missionaries, trappers, traders, and settlers:

- one important trail along the shore of the lake was used by the Indians in their travels from the Green Bay area to the Detroit-Lake St. Clair area
- a second, the north branch of the Sauk Trail, connected the Mississippi River with Lake Michigan
- another trail, still in evidence today winding through the dunes, was used by Indians traveling north to Mackinac
- a fourth route was the Chicago-Detroit road, constructed along high ground in the 1830's; today it is essentially the route followed by U.S. Highway 12.

In 1822, Joseph Bailly, a Canadian fur trader, moved his family and business to a site along the Little Calumet River in what is now part of the

Lakeshore. The Bailly homestead is an important historical site in this park.

The park program includes interpretive hikes, field trips, and programs on the Indiana dunes. These are available on a reservation basis to civic organizations and school groups throughout the year. Environmental education workshops and materials have been developed for teachers. The workshops are scheduled periodically and can be arranged upon request. Credit is offered through National College of Education in Evanston. All hikes are led by Park Rangers and last about two hours except for the four-hour Cowles Bog lunch hike. For further information, write or phone:

The Indiana Dunes National Lakeshore
R.R. 2, Box 139A
Chesterton, Indiana 46304 (219) 926-7561

The Save the Dunes Council is still active. Convinced that the present Lakeshore needs further protection and development and that more land is necessary to protect it, the Council has several goals:

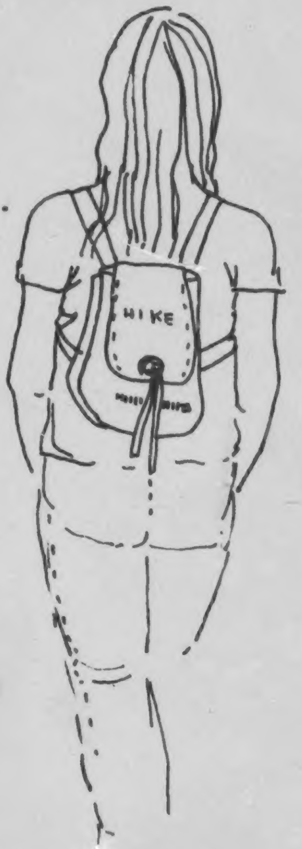
- to work for "legislation to almost double the size of the existing park";
- to work "with Congress and the National Park Service to speed up quality development of the present park, and to make certain that adequate funds for this purpose are appropriated";
- to keep a "watchful eye out for present and potential threats of air and water pollution, to prevent them from affecting the park."

The Council operates an art and ecology shop one mile east of the Lakeshore Visitor Center on U.S. Highway 12 in Beverly Shores. This shop contains books and reprints of articles on the Dunes.

THINGS TO DO:

- Visit the National Lakeshore and take some of the hikes.
- See the geological and ecological exhibits of the Lake Michigan area at the Chicago Academy of Sciences, 2001 N. Clark; hours 10:00 a.m. to 5:00 p.m. daily. Free admission.
- Read some of the writings about the dunes.
- Learn the geological history of the dunes area.
- Learn about the work of, and perhaps join,

Save the Dunes Council, 2000 West Dunes
Highway, Beverly Shores, Indiana 46301.



BOOKS TO ENJOY:

Material available from the Indiana Dunes National Lakeshore, Box 139A, R.R. 2, Chesterton, Indiana 46304

Folder and map on the National Lakeshore

Brochure--General Information, Programs, Facilities

Indiana Dunes National Lakeshore. *An Overview* (covers region, history, geology, flora, fauna)

Hill, John. *Indiana Dunes, Legacy of Sand* (geology). Published by the Indiana Geological Survey. 75¢.

Hill, John. *Geology for the Public*: a Field Guide to the Lake Michigan Shore in Indiana. Published by the Indiana Geological Survey. $1.

Cowles, H.C. The Ecological Relations of the Vegetation on the Sand Dunes of Lake Michigan. *Bot*. *Gaz*. 27: 95-117, 167-202, 281-308, 361-391, 1899. (Can be found in larger libraries)

Komaiko, Jean and Norma Schaeffer. *Doing the Dunes*. What to do and see from Lake Michigan to the Kankakee River. Available from Dunes Enterprises, Beverly Shores, Indiana 46301, $2.50.

Peattie, Donald. *Flora of the Indiana Dunes.* Order from the Field Museum of Natural History, Roosevelt Road and Lake Shore Drive, Chicago, Illinois 60605. $5.00.

Teale, Edwin Way. *Dune Boy*. The Early Years of a Naturalist. Dodd, 1943. Grade 6-up.

NOTE: This information is quoted from the National Lakeshore's brochure on General Information, Programs, Facilities. 1974.

Biking and Hiking Trails

Self-guided hiking trails and bike trails have not yet been developed. All hikes within the Lakeshore are conducted by Park Rangers. Areas within the Indiana Dunes National Lakeshore now open for limited public use during Ranger-guided interpretive hikes are:

Bailly Homestead Area--Contains the Joseph Bailly historic homestead, family cemetery, the Chellberg farm, and part of the Little Calumet River basin. A ravine complex separates the homestead from the farm. It contains the beginnings of a beech-maple climax forest.

Cowles Bog Area--This unique wetland zone is composed of a quaking bog, sedge prairie, wetland woods, and a bog-edge forest. Part of the area is a national Registered Natural Landmark, named after Dr. Henry Chandler Cowles, pioneer ecologist, who formulated theories of succession based on his scientific work conducted in the Indiana Dunes.

Inland Dunes Area--Includes remnants of historic dune ridges which were formed during early, higher stages of the lake. Stabilized dunes covered primarily by oak woodlands. A marsh area separates the two dune ridges.

Mount Baldy Area--Dominated by a huge live or moving dune that is slowly moving southward due to wind and wave action, burying an oak woodland in its path. From the dune's bare plateau the dynamic interaction of Lake Michigan winds and waves on the dunes and beach can be seen.

West Beach Area--Contains shoreline dunes, interdunal ponds, forested dunes, a prairie area, and a small lake. Three major vegetation zones converge here: prairie, northern conifers, and southern deciduous forest.

NATIONAL
WILDLIFE
REFUGE

The National Wildlife Refuges

"In the Service of Wildlife and People"--that is the purpose of the United States Fish and Wildlife Service (formerly called the Bureau of Sport Fisheries and Wildlife) of the United States Department of the Interior. This Service is "the principal agency through which the Federal Government carries out its responsibilities for conserving the Nation's wild birds, mammals, and fish for the enjoyment of all people".*

> "Wild things serve as an early warning system for environmental defense.
> When the environment is polluted--no matter where or how little--wild creatures feel it first, for many are at the beginning of the food chain. The better we protect the environment, the better we provide for the welfare of wildlife, the better we will be providing for our own welfare. We're at the end of the food chain."*

The national Wildlife Refuge System, begun in 1903, now includes over 350 areas, totaling more than 30 million acres. Refuges have been set up to protect rare and endangered species of animals and birds, to provide a place for waterfowl to breed and rest, and to set aside land on which to grow food crops for geese and ducks and other migratory birds. Not only birds and mammals may be found in these protected places, but also plants, insects, amphibians, and reptiles whose populations are declining elsewhere.

Many refuges have an economic effect on their area, too. They contribute to the local economies by sharing revenues from grazing, and sale of timber and hay. Moreover, through the purchase of food, supplies, and lodging by visitors, payrolls of refuge employees, and local purchases of supplies and services by the refuges, money is brought to the area.

Some of you may be familiar with the fascinating areas that comprise the Illinois refuges, while others may know very little but hopefully will decide to add the refuges to your personal "Things to Do" list after reading this section.

*"Conserving Our Fish and Wildlife Heritage", 1974, U.S. Fish and Wildlife Service, Department of the Interior, Washington, D.C. 20240, p. 1.

Crab Orchard National Wildlife Refuge

Canada goose

Crab Orchard National Wildlife Refuge covers an area of 43,000 acres in southern Illinois just east of Carbondale. Though its primary purpose is "to provide a winter home for thousands of Canada geese and ducks in the Mississippi flyway," the Refuge represents an unusual combination of wildlife conservation, recreation, industry, and agriculture. The area has rich ecological diversity because it is near the southern transition zone in Illinois; this zone is a meeting place for many northern and southern plant and animal species. The Refuge contains 21,000 acres of forested land, 65 per cent of which is classified as commercial timber and is managed. Nearly 11,000 acres are cultivated or in pasture to provide forage crops and grain for waterfowl.

A variety of industries--over 25 firms--are located in the eastern section of the Refuge which was once one of the largest ammunition testing and storage depots in the United States. The western section contains the wildlife management areas and facilities for public recreation.

In addition to the usual recreational opportunities of swimming, camping, boating, fishing, and hunting, this Refuge offers self-guided activities: two nature trails, two waterfowl observation towers, a waterfowl display pen, and a seven-mile auto tour route.

Space and facilities for activities of school and other groups can often be provided at the Refuge. Excellent materials for teachers, youth group leaders, and families available from the Refuge Manager include:

- a map-brochure
- a flipchart of "Birds of Crab Orchard National Wildlife Refuge"
- "Making Land Produce Wildlife"--Farmers Bulletin No. 2035, U.S. Department of Agriculture
- Tour Route--seven-mile, self-guided auto route (See the following yellow page for address)

The map-brochure mentioned above states:
"When you visit the Refuge, take only pictures and leave only footprints"
but this admonition overlooks the pleasant memories you are also certain to "take" away with you.

Mark Twain National Wildlife Refuge

Refuges vary considerably in size and character. The Mark Twain National Wildlife Refuge, for example, covers parts of Illinois, Iowa, and Missouri, and is divided into four districts, each with three or four divisions. This Refuge contains the full range of Illinois and Mississippi riverbottom biomes, i.e., communities of living organisms of a single major ecological region, and demonstrates a variety of natural resource management techniques. Large towns which are in the approximate center of the three Illinois districts are Havana, Alton, and Quincy.

In the Chautauqua National Wildlife Refuge (a division of the Mark Twain) there are 5,000 acres, 4,000 of which are water. The entire area is open for wildlife observation, hiking, and environmental studies all year long except from October 15-December 15. Certain times of the year, of course, are especially good for seeing the migrating birds:

October 15-December 15 March 15-May 1	one can expect to see large concentrations of ducks, some geese, and bald eagles
August 15-September 15	one can find the largest concentration of shore and wading birds in Illinois

In the fall of 1974, one-third of the entire waterfowl population migrating in the Illinois River valley was seen in this division of the Refuge with the peak bird population in 1974 reaching 160,000! A spectacular sight!

Teachers and others who are familiar with the Refuge areas are welcome to bring groups. It is hoped that in the future Refuge staff can become more actively involved in environmental education programs.

Publications available from Chautauqua Refuge include:

- Birds of the Chautauqua National Wildlife Refuge
- Mammals of the Chautauqua National Wildlife Refuge
- Habitat Study. A Teacher's Guide for a Class Visit to a National Wildlife Refuge.

The Upper Mississippi River Wildlife and Fish Refuge

This long Refuge extends along the Mississippi River in four states--Illinois, Iowa, Minnesota, and Wisconsin. In the Illinois section of the Refuge there are about 24,000 acres of bottomlands from the Wisconsin boundary to Rock Island.

Dams have created marshlands, sloughs, and open lakes which provide habitat for wildlife. The upper Mississippi Valley is a major migration route for birds. Migrating waterfowl include various diving ducks, surface-feeding ducks, and whistling swans as well as such marsh and wading birds as herons, egrets, and bitterns. In addition to waterfowl, many other kinds of birds plus amphibians and mammals which remain all year are abundant. With this variety of wildlife, there is ample opportunity to learn about the relationships between living things.

green heron

The area is also rich in historical lore with evidences of Indian and French cultures of the seventeenth and eighteenth centuries.

The Refuge makes available many excellent publications to teachers and other visitors, including:

- Amphibians and Reptiles of the Upper Mississippi River Wildlife and Fish Refuge
- Birds of the Upper Mississippi River Wildlife and Fish Refuge
- Ecological Changes on the Upper Mississippi
- River Wildlife and Fish Refuge since Inception of the 9 foot Channel
- Mammals of the Upper Mississippi River Wildlife and Fish Refuge
- National Wildlife Refuges and Environmental Education
- Today's Threat to Our Nation's Wildlife.

snowy egret

Least Bittern

National Wildlife Refuges

- Crab Orchard National Wildlife Refuge--at Crab Orchard Lake in southern Illinois

Refuge Manager
P.O. Box J
Carterville, Illinois 62918

- Mark Twain National Wildlife Refuge--along the Illinois and Mississippi Rivers

For information, write the District Managers of the Refuge areas in Illinois

Annada District*	Annada, Missouri 63330
Brussels District	Brussels, Illinois 62013
Gardner District	Quincy, Illinois 62301
Havana District	Havana, Illinois 62644
Wapello District*	Wapello, Iowa 52653

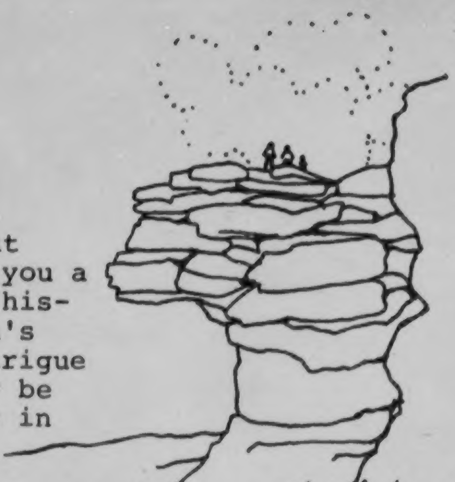
*includes land in Illinois

- Upper Mississippi River Wildlife and Fish Refuge--along the Mississippi River

Information can be obtained from:

District Manager
Upper Mississippi River Wildlife and Fish Refuge
P.O. Box 190
Savannah, Illinois 61074

Refuge Manager
Upper Mississippi River Wildlife and Fish Refuge
U.S. Fish and Wildlife Service
Box 226
Winona, Minnesota 55987



Garden of the Gods

Shawnee National Forest

Are you attracted by nature trails, abundant wildlife, and fascinating rock formations? Are you a history buff or at least somewhat interested in history? Do names like Garden of the Gods, Fat Man's Misery, Devil's Smokestack, and Chipmunk Gap intrigue you and beckon you to investigate? What you may be seeking, may almost certainly be found somewhere in Shawnee National Forest.

Shawnee, the only national forest in Illinois, covers 250,000 acres of land throughout ten counties in the southern one-seventh of the State. Most of the land is on hillsides and ridges that are well-suited to what is called the "multiple-use, sustained-yield management" approach of the Forest Service of the U.S. Department of Agriculture. This management is concerned with the resources of water, timber, forage, and wildlife as well as with recreation.

When this land was designated a national forest in 1933, the slopes had been stripped of vegetation, soil had washed away, the streams were filled with sediment, and much wildlife had disappeared. Today there are many wooded areas, erosion has been slowed considerably, and much wildlife has returned.

In 1970 an experiment began in one area of the national forest to improve water quality and to control extensive erosion through establishment of vegetative cover through the restoration of strip-mined land. Called the Palzo Restoration Project, it is a cooperative effort of the Shawnee National Forest and the Metropolitan Sanitary District of Greater Chicago. For more detailed information on this project refer to the section on Wastes from Water Treatment Plants in the chapter "Wastes as Resources".

THINGS TO DO:

- Learn about the multiple-use, sustained-yield management of our national forests
- Check into the present status of the Palzo Restoration Project by writing the Forest Supervisor, Shawnee National Forest, Harrisburg, Illinois 62946
- Teachers and youth group leaders can write for the following materials:
  Forest Fire Prevention and Conservation Kit Grades 1-4
  Conservation Education Materials Grades 5-9

You may be interested in knowing that Shawnee's deer have increased from almost none in the 1920's to over 20,000 in 1974.

Wild turkeys, which had disappeared and were reintroduced from North Carolina in 1954, now number 3,500.

- Conservation Education Packet   high school and youth
- Forestry Activities-a guide for youth group leaders

(See following yellow page for addresses of district offices)

Special Areas in Shawnee National Forest

Conservation materials and information on many sites in the Forest may be obtained from the four District offices of the national forest:

District Ranger
U.S. Forest Service
Elizabethtown, Illinois 62931

District Ranger
U.S. Forest Service
Jonesboro, Ill. 62952

District Ranger
U.S. Forest Service
Post Office Box AA
Murphysboro, Illinois 62966

District Ranger
U.S. Forest Service
Vienna, Illinois 62995

A few of the areas with special attractions in and near Shawnee National Forest (with indication of their location):

Cave-in-Rock State Park--southeast
Crab Orchard National Wildlife Refuge--west central
Dixon Springs State Park--Indian lore, scenery south central
Fort Massac State Park--south of southeast section of Forest
Garden of the Gods--geological formations--east central
Giant City State Park--west central
Golconda--Pope County Historical Museum--southeast
Harrisburg--Saline County area museum, restored buildings of pioneers--north of east central section of Forest
Indian petroglyphs--along the Mississippi River, west of Carbondale
Iron Furnace--first coal-fired iron furnace in Illinois, in operation from 1839-83--north of Elizabethtown
La-Rue-Pine Hills Ecological Area--rare plants, abundant wildlife, limestone cliffs--west
locks and dams along the Ohio River
Oakwood Bottoms Greentree Reservoir--oak forest
Old Shawneetown--restored buildings--northeast
Prehistoric stone fort--east central
Trail of Tears State Forest--west

For an excellent detailed map of historic, scenic, and recreation sites of southern Illinois write to:

Southern Illinois
Region 9 Tourism
State Regional Office Building
Marion, Illinois 62959

Cemeteries

Use cemeteries for environmental studies? That may seem odd, but we can agree that cemeteries are open spaces and green areas. (This section could also have been included in the historical chapter.) There is a great deal of variety in cemeteries--in size, location, contents, and so on. In urban areas they may be buffers between incompatible land uses and they may give much-needed open, green space. They may be museums for local history. Some may even be like arboretums or botanical gardens. Many cemeteries are excellent places to watch birds.

What one can learn there varies greatly from one cemetery to another. If you are interested in history, look for a cemetery that is old. It is especially important to respect people's feelings about these areas and to talk to someone at the office, if there is one, to explain what you are doing.

If you are interested in history, the following information may get you under way in realizing the wealth of information to discover; Look for such information as:

- on the headstones--name, dates, cause of death; look for headstones of early settlers; these may reveal the history of the area by showing the different ethnic groups that lived in the area and used the cemetery at different times.

- A class investigating the cemetery can be divided into groups and given different areas to cover, recording the information and consolidating it later. A simple record sheet might include:

Name	Sex	Place of Birth	Year of Birth	Year of Death	Age	Cause of Death

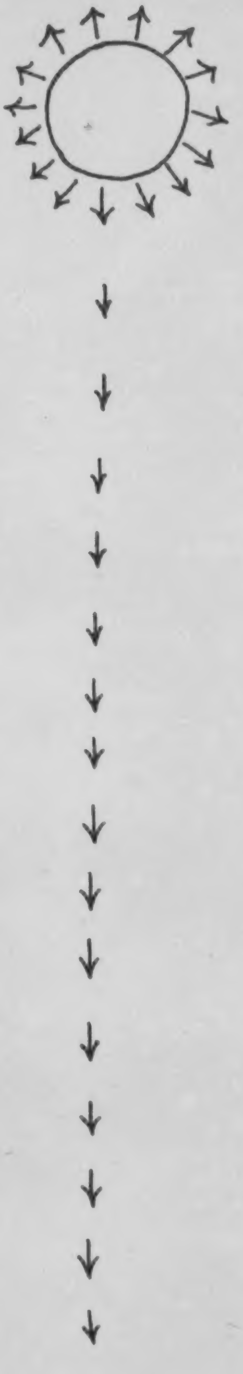
- After the information is compiled you might discuss where the early settlers came from; ages people lived to at different times; you may notice that there were more deaths at a certain time (due to war? epidemics? catastrophe such as fire?).

- Study the materials used for headstones at different times; were they from local quarries? Has any weathering occurred? Note the epitaphs and art forms, perhaps copying any interesting or unusual epitaphs.

In some cemeteries in rural areas, especially early pioneer or family cemeteries, true prairie plants have survived. These areas are fragile and easily damaged, so they should be observed from a distance but not hiked through or trampled. You can learn about prairie plants from outside the fence! If a rural cemetery is surrounded by a farm, look for evidence of erosion in the fields. See if the level of the ground is higher in the cemetery. What has happened? Why?

AROUND THE STATE

Energy



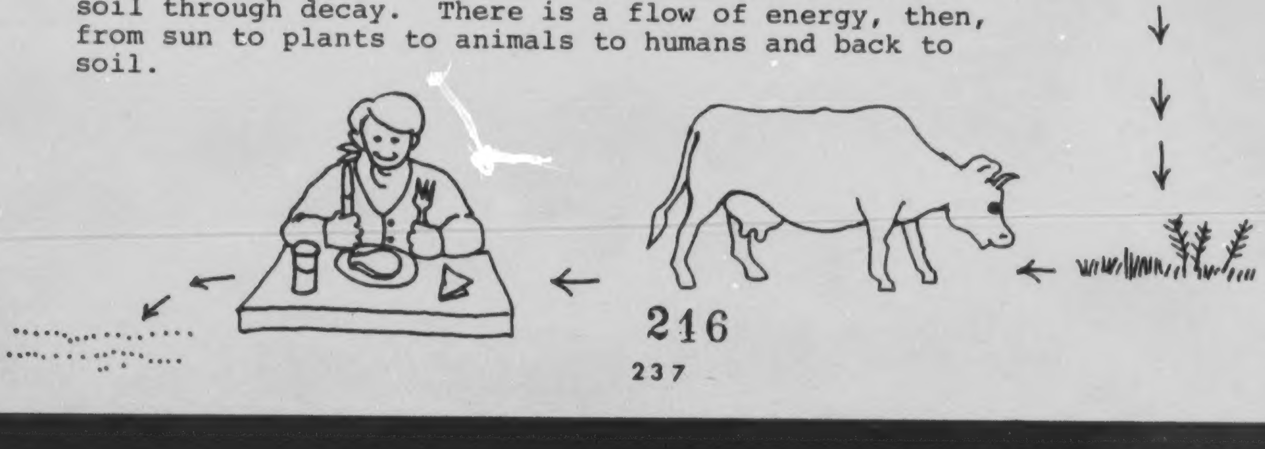
Speçial thanks to J. Ernest Dunwoody, Asst. Energy Coordinator for Conservation and Alternate Energy Sources, Division of Energy, Department of Business and Economic Development, Springfield, for his expert advice and thoughtful help.

The complex subject of energy is one most people are aware of, whether or not they understand it. Just what is energy? Actually, energy is not completely understood by scientists, but they have learned a great deal about what it can do; they know its force and effects. They agree that energy is the capacity to do work, that nothing will start or stop, grow or change without it.

Source of Energy

The main source of energy on the earth is the sun. A portion of the sun's energy reaching earth is reflected or reradiated away into space, but a major amount of this incoming energy is absorbed here on earth. This absorbed energy creates the forces of wind and ocean currents, thus keeping the water cycle in motion. It evaporates water to make clouds and rain. Besides driving the earth's weather machine, the energy from the sun gives living things their energy.

The sun's energy reaches us in the form of heat and light. Green plants absorb this energy. The energy is used to absorb nutrients from the soil as well, and together these are used in the process of photosynthesis to grow and reproduce. Plants are eaten by animals (herbivorous) which use the energy stored in the plant to furnish their own energy. Animals (carnivorous) eat other animals, causing another transfer of energy. Omnivorous animals, such as humans, obtain their energy from both plants and animals. When all these plants and animals die, their stored energy is released to the soil through decay. There is a flow of energy, then, from sun to plants to animals to humans and back to soil.



This energy flow constitutes a food chain. As food energy moves along the chain, a certain fraction of the total energy is used just to keep the process going. The muscle action required for grazing or hunting animals to get their food uses up some of their food energy.

Thus, the longer the food chain, the less of the total energy that was stored by photosynthesis is available to the last consumer in the food chain. Usually the energy is more concentrated but less in total amount after each step in the chain.

Early Human Uses of Energy

Learn more about the history of people's use of energy, such as windmills and waterwheels.

The earliest people had only the force of their muscles to do work. Then people learned to use other natural forms of energy. They invented tools of wood and stone to add to their strength. Later they domesticated animals and added the animals' strength to their own. When people began to raise goats, sheep, chickens, and cattle for food, they were freed from a constant search for food; they learned to use animals such as oxen and horses to help till the land and carry goods and people. Later people learned to use the force of wind and water--for better transportation and, with wheel and pump, to mine and produce metals.

Agriculture

The simple agricultural society which used the strength of people and animals has disappeared from many parts of the world. Today's industrial agriculture uses great amounts of energy in the form of fossil fuels, i.e., it is energy-intensive. Energy is used to:

- cultivate and harvest the crop
- manufacture and transport pesticides and fertilizers
- provide and control irrigation
- improve water polluted by fertilizers, pesticides, and soil runoff
- transport crops to storage depot, processing plant, or market
- transport from supermarket to home.

If you are involved in farming or are asking questions of farmers, you may want to think about the following suggestions* that are offered as less energy-intensive and more environmentally-responsible than many present practices. Consider their advantages and disadvantages.

- Make more use of natural manures, thereby saving energy used to make fertilizer and improving soil.
- Decentralize feedlots, thus putting the source of manure nearer the fields that will receive it. Increase use of crop rotation and/or interplanting cover crops of legumes.
- To control weeds and pests: use rotary hoe twice, cultivating instead of applying herbicides and curbing pollution caused by excessive herbicides; use biologic pest control, i.e., use of sterile mates and introduction of predators.
- Change to a policy of using pesticides only "when and where necessary" and in minimum quantities.
- Urge plant breeders to pay more attention to: disease and pest resistance, hardiness, reduced water requirements, reduced moisture content (to end wasteful use of natural gas for drying crops), increased protein content.
- Use wind power whenever possible and produce methane from manure for use as a fuel.

THINGS TO DO:

- Discuss the advisability of getting more protein directly from plants rather than from beef which requires 10 pounds of grain to produce one pound of beef, pork which is 4 to 1, or poultry which is 3 to 1.
- Consider other ways to eat less processed foods and those lower on the food chain.
- Write down the foods you ate for a recent meal; trace the food chains and learn how many pounds of grain were used to produce any meat you ate, doing research if necessary; example

hamburger	grass	steer	(10 to 1)
milk	grass	milk cow	?
tuna sandwich	?	?	?

- Learn about producers, consumers, and decomposers from a book on ecology.
- Learn about the energy used to process and cook foods; these uses alone account for 80% of the total energy involved from seed to the dinner table. Consider ways to decrease the energy used to prepare foods.

*from "Energy Use in the U.S. Food System" by John S. Steinhart and Carol E. Steinhart, Science, April 19, 1974, pp. 307-16.

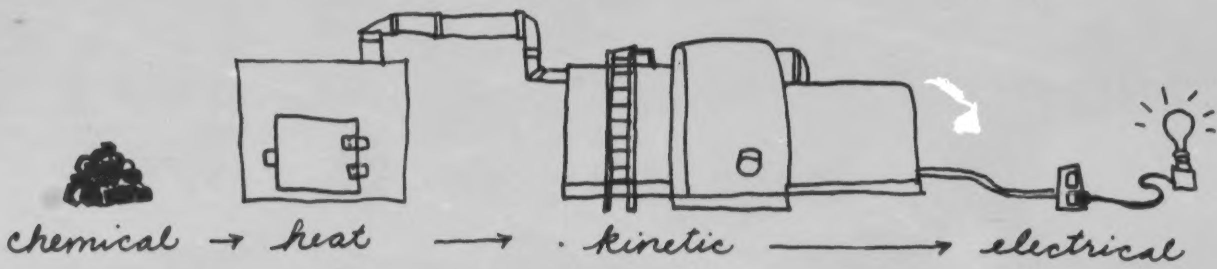
Modern Society

Modern society depends greatly on electrical energy. Some of this electricity is created by turbines moved by falling water; some of it by nuclear reactors; but most electrical energy is produced by burning fossil fuels--coal, oil, and natural gas. These fossil fuels--used to run certain machines and make electricity which runs other machines--were formed from green plants that grew millions of years ago. Fuel is the word used for anything consumed to produce energy. People, of course, use food for fuel for their own bodies. To do other kinds of work, people use wood, coal, oil, falling water, uranium, and so on.

Conversion of Energy

It might be helpful to clarify a point here. Today various fuel resources are used--coal, oil, uranium, natural gas, water, wind, wood, food, and even garbage. For these resources to be put to work, they must be converted. The basic idea of fuel conversion is simple, though most forms of conversion are quite technical. Most conversion includes:

an energy source such as	a conversion device such as	output (the work that results)
gasoline	internal combustion engine	automotive power
coal	boiler with steam turbine electric generator	electricity
falling water	water turbine electric generator	electricity



When energy changes from one form to another, the total amount of energy does not change, but the amount of usable energy becomes less. For instance, when energy in coal is burned to produce electrical energy which in turn is used for light, the light and heat energy produced (which you can see and feel) is harder or almost impossible to use again to do further useful work.

Much of the information on energy consumption and efficiency does not make the important distinction between the several uses of energy which are called direct or end use, indirect use, such as gasoline for automobiles or trucks; natural gas, fuel oil, or electrical energy for heating and cooling homes and other buildings; and electricity to run a refrigerator or lights.

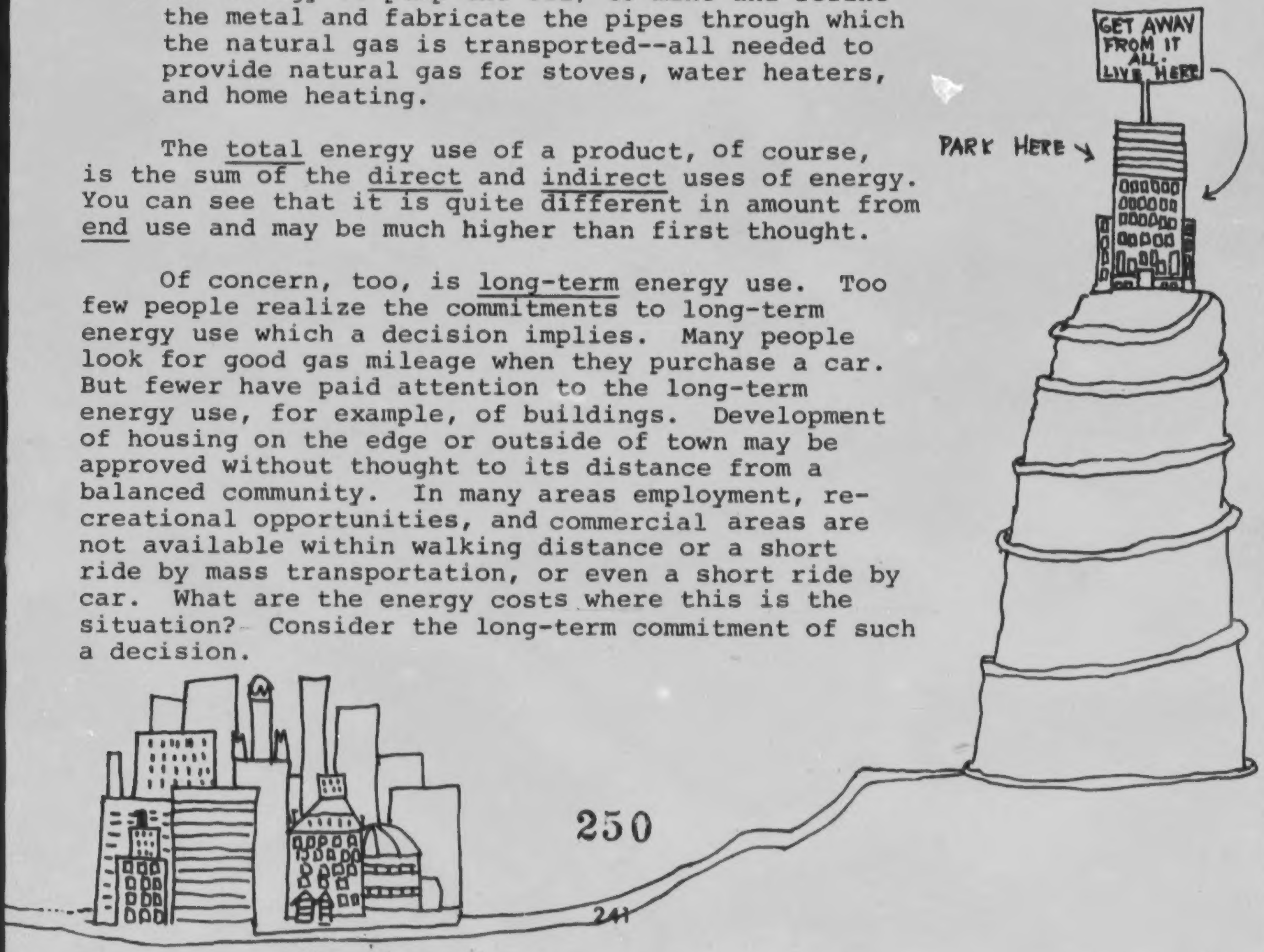
You may want to do library research and find more information on the total energy use for various other products.

Often the amount of indirect energy used preceding the direct or end use may be hidden or not understood, BUT IT MAY BE CONSIDERABLE. Think about:

- the energy used to pump and refine the oil and then transport the gasoline to a service station preceding your end use of gasoline in your car;
- the energy to pump and refine oil and transport it to your home; the energy needed to mine the iron ore, refine the metal, fabricate the storage tank, and deliver it to your home for storage of heating oil--all this used prior to the end use of oil to heat your home;
- the energy to pump the oil; to mine and refine the metal and fabricate the pipes through which the natural gas is transported--all needed to provide natural gas for stoves, water heaters, and home heating.

The total energy use of a product, of course, is the sum of the direct and indirect uses of energy. You can see that it is quite different in amount from end use and may be much higher than first thought.

Of concern, too, is long-term energy use. Too few people realize the commitments to long-term energy use which a decision implies. Many people look for good gas mileage when they purchase a car. But fewer have paid attention to the long-term energy use, for example, of buildings. Development of housing on the edge or outside of town may be approved without thought to its distance from a balanced community. In many areas employment, recreational opportunities, and commercial areas are not available within walking distance or a short ride by mass transportation, or even a short ride by car. What are the energy costs where this is the situation? Consider the long-term commitment of such a decision.

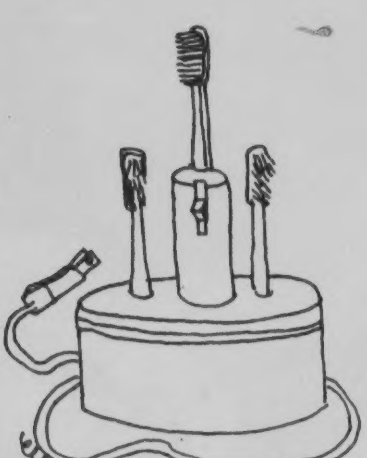

GET AWAY FROM IT ALL. LIVE HERE
PARK HERE

Give thought, also, to the builder who constructs homes at low cost by omitting (adequate) insulation or putting in poorly-fitting doors and windows, or using a design which is not appropriate for the climate. By so doing, the builder can sell the homes at a lower price, but the buyer will have higher operating costs for heating and cooling. For the lifetime of the house, energy will be wasted unless the owner spends more money to make it less energy-consuming.

Individual Use of Energy

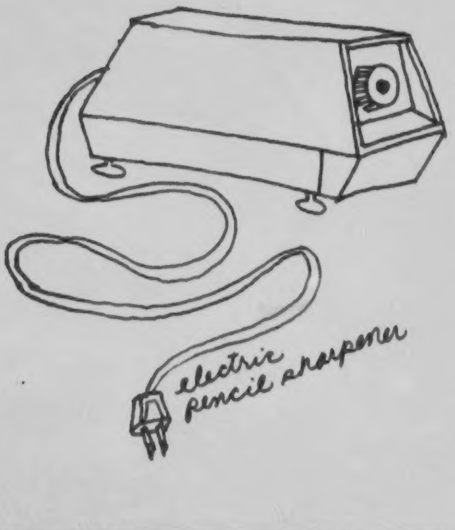
Consideration of your own energy use can be very revealing (and perhaps very shocking). Begin by thinking about the basic needs of people--for food, clothing, shelter. Think about which of your daily activities are concerned with trying to meet these basic needs. Now give some thought to your wants and desires. Which of your activities are related to fulfilling your wants? As you may realize, choices between essential needs of some people or societies and non-essential desires of others often conflict. A clear example of this is some of the choices made between the developed and developing countries of the world.

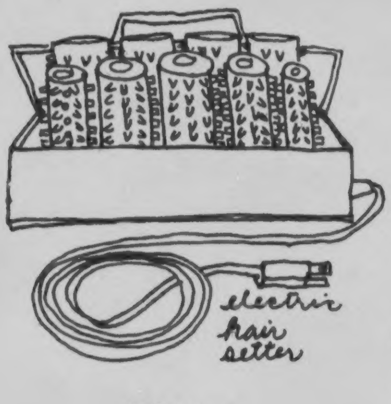
Look at high school parking lots. Do many students drive? Discuss the various effects of such use.

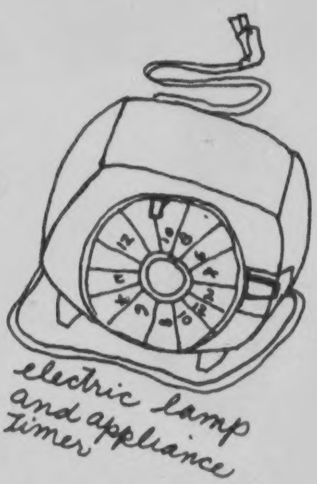

electric tooth brush

Many Americans are so accustomed to the high use of energy in their lives that they do not realize how great their dependence on energy is. One activity, which we call "Energy (or Resource) Reality", can help increase awareness of energy use (and use of other resources, if you wish). This activity has worked well with groups of adults and might be productive from perhaps 4th grade up, in youth groups, families, and so on.

From the outline below you will note that time periods of several hours each are used. For groups of 15 or more divide the people into groups of 6 or less and assign one time period to each group. If


electric pencil sharpener


electric hair setter


electric lamp and appliance timer

you have more people, assign a time period to more than one group but keep each group small. Arbitrarily choose a specific week day for them to consider. Ask one person in each group to act as leader and another to list the activities and record information during the group discussion to report later in this activity. You may find the following outline useful.

Do you know that energy consumption in the U.S. has been doubling every 10 years? But actually decreased 2.5% in 1975?

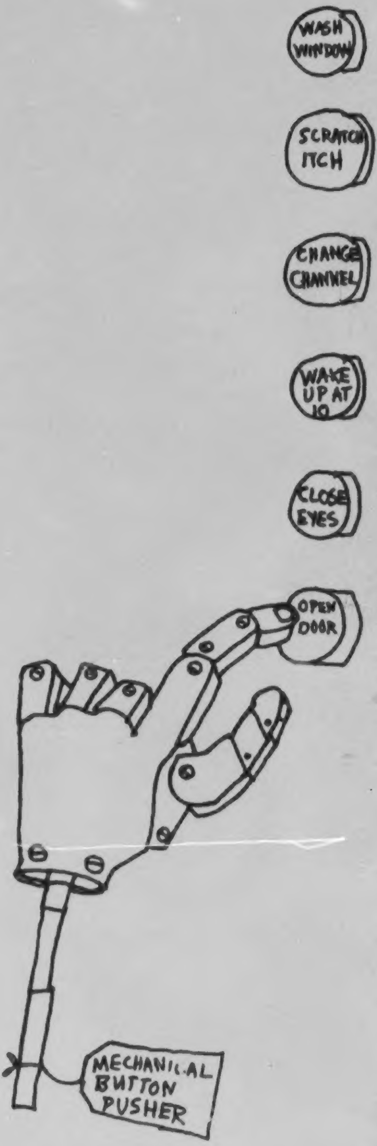
Time Periods	What Happened	Energy Use	(Other Resources	
			Kind	R or N*)
waking up through breakfast	clock radio woke me up	electricity		
	plugged in coffee pot (or made instant coffee)	electricity (gas stove to heat water)		
After breakfast to just before lunch				
Lunch time to late afternoon				
Late afternoon through supper				
After supper to bedtime				

(*R=renewable; N=non-renewable)

Give the groups twenty minutes to discuss and record. After that time see if they are through or need 5-10 more minutes. Then discuss and record information on a large chalk board, asking the recorder or the leader of each team to report. The person leading the activity will have to judge the length of time to continue this activity. Try to keep the discussion open and to make the most of the information that is reported. Encourage the group to draw some conclusions.

A second activity you might find worthwhile is to examine advertisements in newspapers and magazines and commercials on radio and TV. Become more aware of the advertising that surrounds you. Consider the products that you are being urged to buy to make your life easier (or yourself more attractive):

- Do the products meet one of your basic needs? Or do they satisfy desires?
- What energy do the products use (if any)? a lot? moderate amount? a little?
- Are the resources used to make the product renewable or non-renewable?
- What packaging is used on the product and how much energy was needed to make the packaging?
- How much solid waste does the packaging generate?



- Will this product really add to the quality of your life? If so, how? Will it add to the quality of the environment?

Present Car Use

Use of gasoline for automobiles, which has been relatively inexpensive, has caused dispersed patterns of housing--the urban sprawl that has spread out from large cities as well as the developments around towns and smaller cities. During the last 20-30 years, when many people have had the automobile as a private means of transportation, they have no longer felt the need to live close to their place of work or to use public transportation. In fact, when industries have moved from cities to suburban or rural areas, public transportation was usually not available so there was no alternative for workers but to use cars. It is energy-efficient, of course, for people to live not more than five miles from their work. This proximity could be encouraged by such incentives as a tax benefit for living close to employment or a low-interest loan to buy or move to such housing, and/or a graduated tax on travel. Furthermore, regular patterns of travel, such as work trips, are relatively easy to provide by mass transit. However, recreational travel may be difficult to provide this way. Car use still has a role here. Mass transit trips if very long become energy-intensive.

In addition to traveling a distance to work, people have been willing to go far for entertainment, shopping, eating out, visiting and so on. Do you do this? Consider the energy use.

What might be done about the significant waste of energy resulting from traffic congestion with repeated accelerations and idling in stopped traffic? Build better highways or use mass transit?

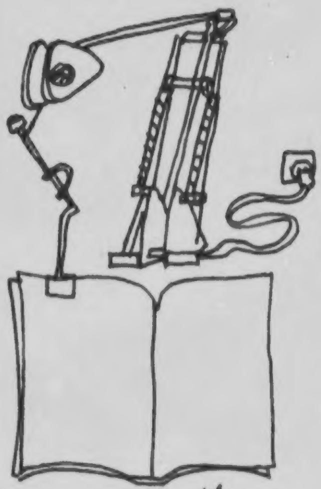
To see another consequence of inexpensive gasoline, you have only to look around you in city and country to see the amount of land given over to the uses of the auto--streets, roads, highways, exit and entry ramps, driveways, parking lots, garages, alleys, and more.

> In some of our cities, up to 70% of the land area is space used by and for automobiles. Does this make sense to you?

Many of you are aware of the disappearance of truck farms from around our cities. Taxes became so high that the farmer could no longer afford to farm his land or could not resist the price the land developer offered him. One consequence of the disappearance of truck farms is that food for cities has to come from greater distances--with increased use of energy to transport the food. Many foodstuffs come long distances by truck. Some foods, such as perishable fruits and vegetables, are shipped by air as well as by truck. This transportation does mean that a great variety of foods is available to us--but at a great expenditure of energy.

THINGS TO DO:

- Compare your or your family's present use of energy in as many ways as possible with use 5, 10, or more years ago:
  car and/or truck--more than one?, gas mileage, distance driven to work, for recreation, for essential errands, other
  house--essential appliances; heating; electrical gadgets
  second home? if so, consider all the implications.
  recreational vehicles--camper, snowmobile, motorbike, boats (motor or rowboat, sailboat or canoe?)
- Look at the energy considerations of any proposed community developments--a new shopping center, housing development, etc.; is the area available to many people by walking or mass transportation; ask questions of your town council or county board to get them to be aware of unnecessary sprawl and resultant long-term energy use.
- You may want to urge a service club you belong to to sponsor a campaign to improve housing insulation in your town; the club might plan insulation work projects for elderly people who own their own homes.
- List the "labor-saving" machines in your home; which are most important to you? Children or young people could find out which are most important to their mother, to their father.
- List all other appliances in your house; which can your family most easily do without?
- Using pictures, drawings, or charts, show changes in "machines" from 1870 on.
- Learn about the energy required to produce convenience foods--the TV dinners, other processed foods.
- Take a look at various types of recreation; consider their use of energy and other resources; compare various types; are those that use more energy more fun?



are you turning the pages of this book by yourself?!?

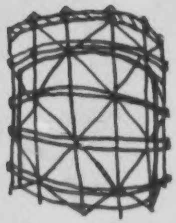
Keep up with the times.
Buy an electric page turner now.

Sources of Energy--Present and Potential

Illinois is a major storehouse of energy resources, particularly farming, coal, oil and gas production.

There are many sources of energy. You may want to learn the advantages and disadvantages of the following:

- Present Sources of Energy--
  - Non-renewable
    - Fossil fuels--natural gas, oil, and coal
    - Nuclear fuels--present-generation reactors and breeder reactors
  - Renewable--wood, hydroelectric power
- Potential Long-Range Sources--nuclear fusion, solar power, geothermal power, wind power.


gas storage tank

NOTE: One of the recommendations of the Committee on Resources and Man of the Division on Earth Sciences, National Academy of Sciences-National Research Council, is that fossil fuels be conserved for uses which cannot be met by other sources. They are needed for petrochemicals (chemicals derived from petroleum or natural gas), synthetic polymers (such as plastics and synthetic rubber), and essential liquid fuels, for which suitable substitutes are not yet known, and should not be used to generate electricity, for heating, and for industrial purposes where substitutes can be found.

THINGS TO DO:

- ▸ Learn more about one or more of the present sources of energy, about their advantages and disadvantages.
- ▸ Learn more about one or more of the possible long-range sources, about their advantages and disadvantages.
- ▸ Learn more about the environmental effects of strip-mining for coal.
- ▸ Look at the types of energy used in your home; compare the amounts of each used per month, the cost of each, reasons why certain fuels are used.
- ▸ Look at the sources of energy in your school or place of work; ask the custodian questions concerning amounts, costs, reasons for use of certain fuels.
- ▸ Consider the construction of your home or school or place of work; the materials used; the energy needed to produce the materials and transport them; the design of the building; possible alternative materials; advantages and disadvantages of materials used and alternative materials.

Illinois is criss-crossed with energy transmission lines--pipelines and high voltage power lines as well as railroads.

▸ Look at the different types of energy used in your community; what their sources are; how they are transported; how measured; what the costs are; the advantages and disadvantages of each. Find out about the derivatives of oil (gasoline, plastics, synthetic fibers) and coal (drugs, dyes, fertilizers, etc.).

Conservation of Energy

IT SEEMS QUITE CLEAR THAT THE DAYS OF INEXPENSIVE ENERGY ARE OVER. Those who have not squarely faced this fact before must do so now. While it is hoped that research and development continue for new and better sources of energy, it seems essential that Americans take a close look at our use of energy and other resources--and examine and change our over-consuming ways.

DO YOU KNOW THAT

U.S. citizens, who make up less than 6% of the world's population, use 32-35% of the world's energy?
Think what these figures mean. Consider the implications.
Think of possible political ramifications.
Discuss moral and ethical implications.

Energy and money are required to control water, air, noise, and land pollution. Only rather recently have some people urged that this energy requirement be charged to the process or product causing the pollution. If this is done, as seems very possible, the price of some goods and services will increase to reflect their true cost.

The need for energy conservation seems clear to many people. What are their reasons besides increasing costs? Reasons seem to be political and ethical as well as economic:

- as the readily available energy resources become more scarce, the cost of energy will continue to increase; and the more energy a product or service requires, the more its cost will increase compared to other products and services
- the more we use up our readily available, less expensive energy resources, the more we will have to rely upon harder-to-obtain, more expensive resources

- conserving energy will result in fewer dollars being used to obtain energy from outside the U.S. and thus less of a dollar drain
- conserving energy will result in fewer political pressures and opportunities for leverage by other countries that have resources we desire
- the more of our resources that are used to obtain energy, the more expensive will be the goods and services the U.S. produces and the less competitive the U.S. will be on the world market
- concern that we are fast using up resources with little thought for future inhabitants of the earth.

We can, of course, continue present energy use, paying the increased cost of energy if we can get the energy. We can decide to do without many conveniences in our life, though this is rather unlikely. What appears as the most responsible, most thoughtful, most acceptable alternative is to devise ways to achieve a comfortable life while using far less energy to do so.

This last alternative offers a real challenge. To improve the efficiency of our use of energy resources, it would seem that we need:

- to develop an energy-use ethic that distinguishes between essential energy needs and non-essential energy uses and that also considers long-range environmental impacts
- to create a national energy policy.

bright idea!

Regarding the latter, important beginnings could be wise land use planning, with the development of well-planned communities, and the improvement and extension of mass transportation, especially railroads.

Energy conservation is not something that our national leaders can accomplish for us. Individuals can begin by doing things in their own lives to conserve as much energy as possible and by pressing their local governments to make decisions on the basis of energy efficiency. Furthermore, individuals and groups can contact state and federal officials, urging that greater consideration be given to energy efficiency in their deliberations and decisions.

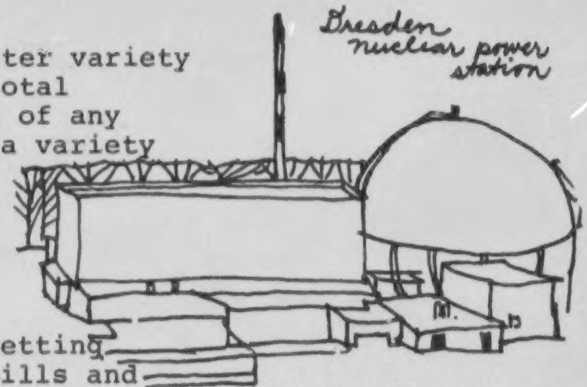
To the increasing numbers of people who realize and respect the limit to the earth's resources, the present energy shortage or energy crisis is considered a blessing in disguise. These people say they find, through experience, that wasting less may be a way to better life and is a smarter way to live because:

- saving fuel and electricity reduces costs for home utilities, automobile operation, and recreation
- then the cost of repairs and servicing decreases
- the reduced demand for scarce fuels and other resources helps to curb inflation
- the less energy-consuming machines are used, the longer they last, resulting in a saving of dollars, metals, and other vital raw materials
- when demand for energy is cut back, air quality will improve, less valuable land will be taken for highways, parking lots, generating stations, and so on
- a more healthful environment will result in better personal health
- energy saved on necessities may be used for recreation and saved for future generations

What is your reaction to each of these reasons?

Variety of Energy Sources

Consider the relationship among a greater variety of energy resources, the stability of the total energy supply, and the effects of shortages of any one source. What is your conclusion about a variety of energy resources?



Illinois is a center of refining and storage facilities.

THINGS TO DO:

- Visit a coal-fired power plant.
- Visit a nuclear power plant.
- Learn about the problems that attend getting fuel from place to place, i.e., oil spills and the environmental impacts of such spills in the ocean and on land, and what can be done to prevent such accidents.
- Learn the pros and cons of the Alaskan pipeline.
- Consider ways you and your family can conserve energy. Try them.
- Discuss the statement "the energy shortage is really 'energy overconsumption'".
- Consider the energy use when high school students drive cars to school. Could many of them take a bus, bicycle, or walk? You might also want to look at the environmental impact of the school parking lot. Is it black-topped? Where does the runoff water go? What is the effect on air quality of these cars?
- To participate in/find out about the Illinois Energy Conservation Youth Leadership Training Program (adults and grades 10-12), contact: Prof. Troyt York, c/o Energy Management Program, Eastern Illinois University, Charleston, IL 60466.

ADVANCED RESEARCH: The big users of energy are:
Industry 32% Transportation 24%
Utilities 25% Homes and Offices 10%
Find out ways these big users can conserve energy.

BOOKS TO ENJOY:

Bendick, Jeanne. Why Things Work: A Book On Energy. Parents, 1972. Grades 1-3. $5.

Busch, Phyllis S. Dining on a Sunbeam: Food Webs. Four Winds Press, 1973. Grade 4. $5.

Citizen's Advisory Committee on Environmental Quality. Citizen Action Guide to Energy Conservation. Order from Supt. of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Stock No. 4000-00300. High school-adult. $1.75.

Fritsch, Albert J. The Contrasumers: A Citizens Guide to Resource Conservation. Praeger, 1974. High school-adult. Paperback, $3.50.

Gutnick, Martin J. Energy: Its Past, Its Present, Its Future. Children's Press, 1975. Grade 4-up.

Harrison, George Russell. The First Book of Energy. Watts, 1965. Grades 4-6. $3.50.

Hoke, John. Ecology (A First Book) Watts, 1971. Grades 4-6. $3.50.

Holdren, John. Energy: A Crisis in Power. Sierra Battle Book 1972. High school-adult. Paperback. $2.75.

Lappe, Frances Moore. Diet for a Small Planet. Ballantine Paperback, 1971. High school-adult. $1.50.

Podendorf, Illa. The True Book of Energy. Children's Press, 1971. Grades 2-5. $5.00.

Schwartz, George. Food Chains and Ecosystems: Ecology for Young Experimenters. Doubleday, 1974. Grade 6-up. $4.50.

U.S. Department of the Interior. "So You Want to Get Involved" contains 1 page on making a community inventory. Washington, D.C. 20240.

U.S. Environmental Protection Agency, Office of Public Affairs, Washington, D.C. 20460. Questions and Answers about Nuclear Power Plants.

U.S. Senate, Readings on Energy. Selected materials compiled by the Congressional Research Service at the request of H.M. Jackson, Chairman, Committee on Interior and Insular Affairs, pursuant to S. Res. 45. The National Fuels and Energy Policy Study. 1975. Serial No. 94-1 (92-91). Order from Supt. of Documents, U.S. Government Printing Office, Washington, D.C., 20402. $4.80.

NEWSLETTERS:

- Energy Reporter, a Citizen Newsletter; organizations, firms, schools districts, or other groups can get on the mailing list by writing: Federal Energy Administration, Washington, D.C. 20461
- Illinois Energy Issues. Monthly. Illinois Department of Business and Economic Development, 222 S. College, Springfield, Il. 62706. Free.
- Illinois Energy Newsletter. Monthly newsletter of energy events of state and university interest. Free from Energy Resources Center, University of Illinois Circle Campus, Box 4348, Chicago, Il. 60680.

Teachers may want to write to the National Science Teachers Association for their brochure on Energy-Environment Materials. Write to NSTA, 1742 Connecticut Ave., N.W., Washington, D.C. 20009.

(See page 45, bottom, for more information.)

For you who wish to delve more deeply into the topic of energy:

A Time to Choose: America's Energy Future. Final Report by the Energy Policy Project of the Ford Foundation, S. David Freeman, Director, Cambridge, Mass. Ballinger, 1974. Adult. $3.95.

Environmental Study Areas for Energy

Because one can learn about energy in so many places, specific sites cannot be listed. However, kinds of sites are included here. Check to see if tours are given or if arrangements can be made for groups.

1. Contact your local electric or gas utility company and ask if you (or your class or group) can visit their facilities, such as a coal or nuclear electric generating station or gas pumping station.

2. In rural areas, try to visit a grain drying elevator; ask the elevator operator to explain how fuel is used in drying grain.

3. In downstate Illinois there are many oil wells and oil tank farms which you might contact to arrange a visit.

4. The Alton-Granite City and Joliet areas have numerous oil refineries, such as Union 76, Shell, and Mobil. Contact the public information officer or environmental engineer in charge of the refineries to try and arrange a visit.

   One can see here how crude oil is brought in by barge or pumped in, broken down into petroleum products, and shipped on. Furthermore, one can see such environmental control aspects as water treatment facilities and air pollution control devices.

5. Visit your waste water treatment plant to learn about the energy required to operate such a plant.

6. Visit a greenhouse or glass house (which is really an energy-collecting source). Especially in the winter time, you can see how the sun's rays pass through the glass, are trapped inside the glass, and keep it warm.

7. An increasing number of small solar energy devices are being built around Illinois. Ask the Science Departments at a nearby university, for example.

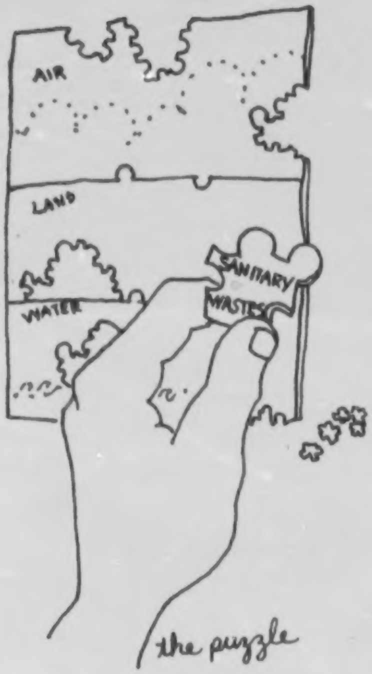
Wastes as Resources

It is not easy to change ways of doing things. New solutions that might seem reasonable and convincing to some people may not be acceptable to others. Inertia makes change difficult. The money, time, and effort invested makes people reluctant to change. Vested interests often fight change. Psychologically, many people cannot easily accept new techniques, processes, and procedures, no matter how logical and sound the new ways may seem. In some cases, jobs might be eliminated or considerably altered and new jobs created. Those whose jobs would disappear fight to keep the status quo; those whose equipment or related services would no longer be needed get in the battle.

There is also a technical argument against change. Knowledgeable people sometimes disagree as to the merits of proposed changes. The catalytic converter, for example, was hailed as an important step in reducing automobile exhaust emissions. Results of the first year of use showed that the device does not perform as well as expected and that it has an undesirable environmental side-effect. Process inventors and salesmen have been quick to exploit the zeal of the environmental movement. The old adage "Let the buyer beware" was never more applicable. Mistakes made in the name of the environment could further delay the changes we want to come.

Where large investments are required, there is good reason for really important change to come gradually. This allows for new equipment, processes, and techniques to be tested, results to be observed, consequences to be anticipated, and other segments of the society to have time to adjust.

It is often difficult to make trade-offs for long-term environmental gains when economic effects might be immediate. Equipment in plants and other technology, planned and brought into being some years ago, may be inefficient or obsolete but may still be used rather than investing in new equipment. For example, people still drive old or high-powered automobiles which may use excessive fuel and be quite polluting. Decisions made now for future equipment will still have effects many years from now when the equipment cost is finally paid off. By then the equipment itself may be quite inefficient and out of date.



the puzzle

However, increased environmetal awareness may lead to attitudes and behavior of conserving, reusing, and recycling many more resources than is being done at present (so that we will not continue to be such a wasteful society).

A few examples of wastes as resources are presented here for you to think about. Consider their advantages and disadvantages and see how you feel about the attitudes shown and the ways of acting. Try to find other examples as you look around.

The daily output of wastes of various kinds in our society is staggering. Some people urge us to think of a) land, water, and air as a unit whose separate parts interact, b) the earth as a spaceship, a closed system in which there are three alternatives: to recycle, to transfer the form or location of the waste or pollutant, or to confine the wastes somewhere, and c) pollutants as resources out of place. An example of the latter is that sanitary wastes emptied into streams or lakes pollute the water, but the same wastes used on land can be a useful fertilizer.

Although our society presently is not strongly oriented to finding uses for wastes, here are a few examples. When you get the idea, you can look around to try to locate other possibilities.

I. Wastes from Yards

A simple, every-day example of wastes as resources are yard wastes in the form of leaves, grass cuttings, twigs, and branches. Some people put grass clippings in bags, baskets, or cans and bundle the branches and get rid of them with other solid wastes. In nature, composting is done naturally when these parts of plants and animals, fungi, and insects act upon this debris, breaking it down so that the nutrients that were in the living plants are returned to the soil. Many people imitate this process and have learned ways to speed it up. The result is a rich crumbly material which enriches the soil and loosens heavy soils. It can also be used as a mulch to keep down weeds and grass around shrubs and to hold moisture around plants.

A Compost Pile

A simple compost pile can be made by piling up four or five layers of leaves, each 3-6 inches deep; on each layer sprinkle a handful of high-nitrogen fertilizer or manure and a few shovelfuls of soil. The soil will provide decay-producing organisms. Make a depression in the middle of the pile to cause rain to run to the center rather than off the sides.

Wet down each layer to the consistency of a damp sponge. Stir up the pile or turn it over periodically (every 4-6 weeks) with a pitchfork to allow oxygen to penetrate the pile. Remember that bacteria and fungi need air to break down the wastes.

A mixture of grass clippings, shredded twigs, and leaves makes a better compost pile than any of these alone.

Leaves can be used as a mulch in shrub borders or simply ground into fine particles when the grass is mowed and left to decompose in the lawn. Use a regular lawn mower with or without a leaf-mulching attachment (which can be bought with many rotary mowers or purchased as an accessory).

II. Garbage and Trash

A. Creative Garbage Piles--the Mt. Trashmore concept

A project of the Forest Preserve District of DuPage County has resulted in a hill of garbage and a 65-acre ground-water lake. This "garbage" makes a positive contribution to an area of gently rolling, former prairie land in northeastern Illinois that has few natural lakes and streams. The large lake was made from a gravel pit which still contained unprocessed gravel. The sale of the gravel not only covered operating costs of the excavating, but also resulted in a substantial profit. Moreover, there was revenue from a charge to scavengers (private garbage-haulers) who used the site for dumping. (The revenue was used by the District to develop other facilities.)

SKI
MT-
"TRASH-
MORE

The hill was constructed of refuse material packed inside cells of clay which were made from material excavated from the lake. Thus, a landfill site was provided, unwanted clay was used, and a winter sports hill appeared on the landscape that will eventually have several toboggan runs and beginner ski runs! Attempts are being made to use the methane gas,

which is produced in the hill as decay proceeds, as an energy source.

Plans include grading and seeding of the lake shoreline and banks, a road system, hiking trails, picnic areas, a second smaller lake for swimming, a third lake stocked for fishing, a marina, a family campground, an outdoor amphitheater, and a nature study area.

The Mt. Trashmore concept, as it is familiarly called, will be used for two other sites owned by the DuPage Forest Preserve District: Green Valley, where work began in October, 1974, on a landfill hill for recreation, and Mallard Lake, a similar site opened in March, 1975.

Does this idea have possible application in other flat areas of our state? A hill gives diversity to the landscape as well as recreational opportunities. Moreover, in some areas the water table is so high that satisfactory sites to dig for landfills are difficult to find.

B. From Garbage to Electricity

Burning garbage to provide electricity is a productive way to work on several problems at once--saving coal (or oil or gas); improving air quality by cutting down the amount of high-sulfur coal burned; helping to dispose of garbage and trash; and also possibly recovering various metals and glass.

A cooperative study begun in 1972 has led to a cooperative effort between Commonwealth Edison and the City of Chicago to use solid waste to help generate electricity. This arrangement provides a way for Commonwealth Edison to obtain a good, supplementary low-sulfur fuel and for Chicago to get rid of some of its solid wastes at lower cost. Since the utility company boilers can burn prepared garbage more cleanly than city incinerators (because initially only one-tenth of the fuel is to be garbage, eventually going to twenty to twenty-five per cent, they hope), less air pollution will result. This arrangement requires a constant supply of wastes generated nearby, making it most feasible in a metropolitan area.

Plans call for the city to build by mid-1977 a processing plant near one of Commonwealth Edison's generating stations to handle 250,000 tons of solid waste annually. The City estimates that the utility will pay $700,000 annually for the solid waste; the sale of recyclable materials separated from the refuse at the plant will add an additional $200,000; and $600,000 a year will be saved by this new method of waste disposal. This project is expected to lower the costs for waste disposal 50 per cent per ton.

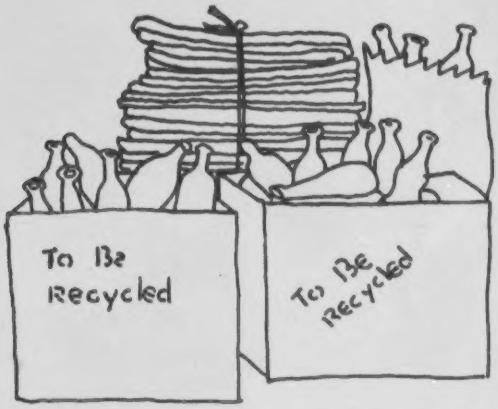
Commonwealth Edison estimates that the garbage will replace about 100,000 tons of coal annually. This process has several advantages, one of which is that an established system already exists for producing, distributing, and marketing electricity, and there is an assured market for the electricity produced.

A similar project is expected to be fully underway in St. Louis by 1977. Union Electric Company will use domestic solid wastes, excluding bulky, oversized wastes such as tires, appliances, and furniture, collected from the city of St. Louis and seven surrounding counties, and grind it in a large hammermill. An Illinois company will recover and recycle the magnetic metals while glass, ceramics, and other non-magnetic materials will be landfilled. It is anticipated that burning the shredded, combustible materials along with coal to produce electrical power will reduce the utility's annual purchase of coal by one million tons.

Other positive aspects, both economic and environmental, are: revenue from the fuel produced plus that from recoverable materials, reduction in the cost of disposal, conservation of energy and materials, reduction in water and air pollution, and reduction in need for waste disposal (about 95 per cent). What disadvantages do you see?

C. Recycling Glass, Metal, Paper, Etc.

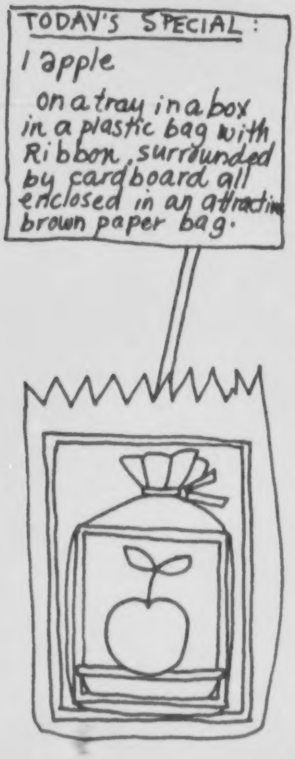
Over a decade ago, as a consequence of the space program, the concept of spaceship earth evolved. That concept recognizes that the earth is a closed system which gets no resources from the outside except for sunlight which continuously reaches the earth. Realization of the significance of this concept has led to the understanding of the value of thrift and the re-use and recycling of as many resources as possible. Though recycling is appealing to many people, it is in conflict with the throw-away philosophy which has been popular in our society for the past several decades. Planned obsolescence has become an integral part of most people's thinking and behavior. Fortunately, a change seems to be occurring in national attitudes--with an increasing desire to preserve and improve the quality of the environment, a new concern for the conservation of energy, a growing realization that our resources are finite, and a willingness to change to more environmentally-responsible life styles.



In recent years, local recycling centers have been set up in many communities around the state. The Illinois Institute for Environmental Quality publishes an "Illinois Directory of Environmental Information". The 1973 Directory included more than thirty counties with one or more recycling centers, while the 1975 edition lists fewer than thirty counties. The most commonly-handled materials are: glass; cans--all steel, bi-metal, and aluminum; and paper--mostly newsprint, in some cases cardboard and magazines; in a few cases phone books, catalogs, and scrap paper.

Some recycling groups have concluded that while recycling is a popular idea in their communities, voluntary individual efforts are not enough. They believe recycling is important enough for local and county governments to give it priority by having a government-run recycling center. However, with fluctuations in the market, it may be difficult to make such a center economically self-sustaining.

At least a few local environmental commissions have tackled the problem of reducing the amounts of solid wastes generated by their communities. Some efforts have included working with supermarket managers to reduce the amount of packaging on meats and produce and to encourage the use of returnable bottles.


TODAY'S SPECIAL:
1 apple
on a tray in a box in a plastic bag with Ribbon, surrounded by cardboard all enclosed in an attractive brown paper bag.

It is important to recognize that recycled materials become the raw material for industry. Two things are necessary: 1) there must be industries nearby that need these raw materials and 2) the materials must be pure enough so that they do not "pollute" the industrial processes. Many recycling centers have trouble adhering to these requirements. Recycling operations should not begin until both requirements are understood.

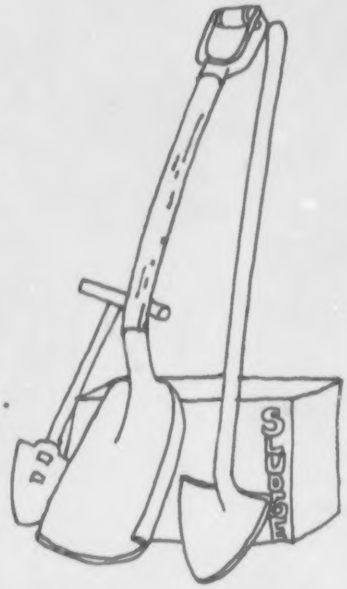
Special Research--Learn about the inequitable federal tax policies--one of the most important obstacles to recycling. Present policies provide economic encouragement for use of virgin materials to the direct economic disadvantage of recycled materials. Transportation rates discriminate against recycled materials, being as much as 50 per cent more for some recycled materials than for virgin materials.

III. Wastes from Water Treatment Plants

The amended Federal Water Pollution Control Act of 1972 encourages the consideration of using land for the recycling, re-use, and utilization of sewage and sludge, thus challenging conventional methods and conventional thinking. However, the use of land for waste disposal seems to create more controversy than any other disposal process. There is less public acceptance of land disposal than of conventional processes of waste treatment. There are public health concerns, problems of controlling odors, and social and aesthetic considerations. The major problem to be solved is a social one. Education is not the whole answer. People fear most the loss in property values. Everyone likes to think that there is a technical solution to every problem and that all we have to do is to push our energies and scientists a little harder. But this is not the case in land disposal.

However, the benefits can be great: restoration of unproductive and marginal land resulting in adding to the tax base of a county, production of agricultural crops to feed people and animals, and the decrease in the cost and problems of finding sites for urban waste disposal.

A. Sludge



The usefulness of sludge has long been recognized. Many individuals obtain it from their sanitary treatment plant for use as fertilizer for vegetable gardens as well as for flower beds, lawns, shrubs, and trees.

The best time to get the sludge (and use it) is in the fall when the weather is relatively dry, but it can be obtained in the spring (though not right after a rain). Take small, strong containers that can be easily cleaned afterward, and a shovel.

NU EARTH

THE METROPOLITAN SANITARY
DISTRICT
OF
GREATER CHICAGO

major plant nutrients :

Nitrogen	(N)	4%
Phosphorus	(P_2O_5)	6%
Potassium	(K_2O)	0.1%

In at least one instance dried sludge is sold as a natural organic fertilizer, i.e., the city of Milwaukee, Wisconsin, bags and sells this product under the name Milorganite.

It is important to note that the Advisory Committee to the Illinois Environmental Protection Agency has concluded that:

> "The most environmentally acceptable alternative for solving the municipal sludge management problem is utilization of stabilized sludge on land for agriculture or reclamation purposes. The efficient recycling will help to conserve the nutrient, humus, and energy resources of the State while serving its economy...The Committee agrees that methods exist or can be devised for safe, environmentally acceptable, agriculturally sound and efficient utilization of municipal sludge on land."*

CAUTION--

You may want to limit use of sludge to shrubs, lawns, trees, and non-root vegetable crops. There is some controversy (and a lot of current research) about the uptake of trace and heavy metals by root crops (potatoes, beets, onions, etc.). Some of these metals tend to concentrate in certain plant material. There may be adverse health effects from regular ingestion of these metals.

B. Palzo Restoration Project in Shawnee National Forest

An example of an attempt to reclaim strip-mined land by recycling sewage waste onto the land is the Palzo Restoration Project. In 1966 the U.S. Forest Service purchased 312 acres of abandoned strip-mined land in Williamson County (called the Palzo Tract) for Shawnee National Forest, to be used as a practice area for heavy equipment operators being trained at Shawnee's Job Corps Center.

Much of this land was barren and wasted, with high soil acidity, after being subjected to mining activities from 1959-61. In April, 1970, the Forest Service was requested by the Illinois Sanitary Water Board to correct the health and environmental hazards created by drainage of acid water into streams from the Palzo Tract. The reclamation pilot project resulted. It involves the application of digested municipal waste to the strip-mined land. The wastes, which have received secondary treatment, are shipped from the Metropolitan Sanitary District of Greater Chicago by rail, stored in receiving lagoons, and then applied to spoil banks previously graded by bulldozers, using a specially-designed overhead spray irrigation system. During application, accumulated solids are regularly disced into the first 9-12 inches of soil to help provide protection against erosion, increase infiltration rates, and minimize odor problems should they occur. Water samples of surface, ground, and soil water are taken on a regular basis.

---

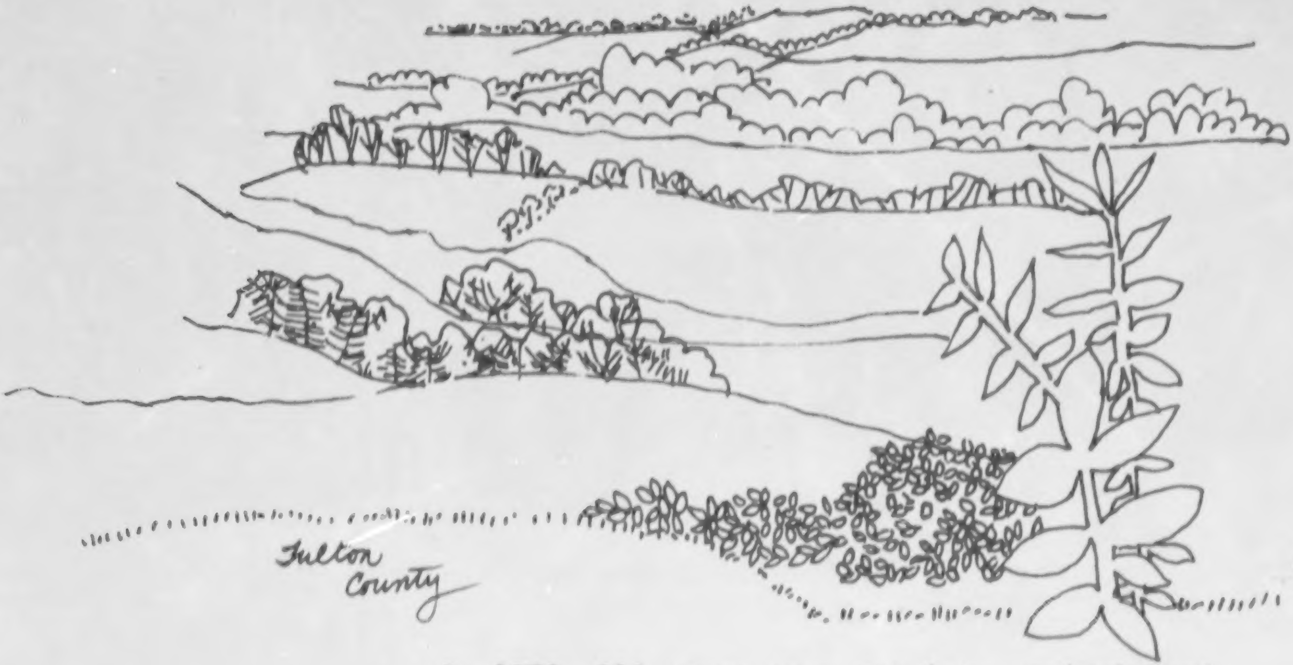
*"Illinois Advisory Committee on Sludge and Wastewater Utilization on Agricultural Land" Report, Illinois Environmental Protection Agency, February, 1975, p. 14.

The water pollution problem formerly associated with the area is expected to be significantly reduced. In addition, extensive erosion will be controlled through establishment of vegetative cover and resultant return of wildlife which had been almost nonexistent since the mining. It is hoped that this project will contribute techniques for reclaiming thousands of acres of strip-mined land, resulting in improvement of water quality in southern Illinois. There the land which was strip-mined for coal is a constant source of severely polluted water.

Equipment difficulties encountered in the application and other problems have caused delays and have been expensive, but attempts are being made to solve the problems. The Forest Service wants this project to be viable.

C. Fulton County Sludge Utilization Plan

Using sewage sludge for land reclamation was the choice of the Metropolitan Sanitary District of Greater Chicago (MSDGC) over several other disposal alternatives. The District purchased 7,000 acres of former strip-mined land in Fulton County. After a thorough inventory of the physical characteristics of the land, a Fulton County Steering Committee, comprised of local elected officials, local citizens, representatives of state and federal environmental agencies, and Sanitary District Trustees, was set up.



In 1972, 810 acres were put into agricultural production; by the end of 1973 more than 3,000 acres had been reclaimed. Three and a half thousand additional acres were purchased more recently, bringing the total to 10,500 acres.

An important aspect of this program is the planned reforestation of all river and stream banks and the dividing of the land by means of hedgerows. These natural barriers will cut down the flow of nutrients into the streams during heavy rains and encourage wildlife, especially birds, which hold down the numbers of insect pests.

Restored acres are producing hay crops, yielding 2 1/2 tons of hay per acre, as well as corn, soy beans, and alfalfa.

The process begins with digested sludge in the District's plants, which is transported daily by barge down the Illinois waterway to Fulton County. Here, the processed sludge is transferred to holding ponds until it is sprayed on the low-grade land. In 1975 they started to move from application by spraying to incorporation by discing the liquid fertilizer 10-12 inches below the surface.

This process has several advantages:

- elimination of land, water, and air pollution which may come from processing the sludge completely in the urban area
- lower cost than other sludge disposal methods
- elimination of additional lagoon space in urban areas

- beneficial use of the nutrients in the organic material and water making up the sludge to reclaim unproductive or low-grade pasture land.

There are problems which are difficult to solve:

- the liquid sludge, when in the holding ponds and first sprayed, has a musky odor, like a mild petroleum smell, which disappears within minutes of its application to the soil
- there is concern over a possible build-up of heavy metals, the effect of which is not yet known.

Because of these problems, this project has received different degrees of acceptance in the community.

D. Salt Creek Plan of the Forest Preserve District of DuPage County

A unique plan has been prepared for the Forest Preserve District of DuPage County that recognizes a river (Salt Creek) as a living component of the community. Initial implementation of this plan, which innovatively deals with many problems, began in 1975. The total plan includes:

- flood control--by giving the flood plain (a plain bordering a river and subject to flooding) back to the river, removing some homes, building a dike, and turning one hollow into a lake and another into a reservoir
- improvement of water quality through control of runoff storm water
- preservation of open space for recreation and aesthetics
- preservation of prime agricultural land in an urban area
- experimentation with liquid fertilizer on golf courses and on agricultural land acquired by the District.

The use of treated waste water on golf courses and agricultural land would have the several benefits of:

- reducing the demand on groundwater supplies during the hot months
- providing organic fertilizer to the golf courses
- providing further treatment of the sewage treatment plant effluent which would have already received secondary or tertiary treatment

- producing income from the sale of crops grown on the agricultural land.

Cooperation of the Forest Preserve District, the DuPage County Regional Planning Commission, and several municipalities along Salt Creek has been another of the benefits from this project. Many citizens are very encouraged by this sort of cooperation.

IV. Cooling Lakes

In several parts of the state, large lakes have been constructed to receive water used for cooling in nuclear power plants. At least one of these lakes covers 8,000 acres.

An arrangement has been made between the power companies and the Department of Conservation for the Department to manage several of these lakes for recreational purposes--fishing, waterfowl hunting, and picnicking.

bass

In areas of these cooling lakes, the water temperature is higher than that in natural bodies of comparable size. There is a difference of opinion on the long-term effects of the higher water temperature on fish and other life in these lakes. At present, the general conclusion seems to be that these lakes will support rather good sport fishing, especially bass. To date, there is no conclusive evidence that the warmer water is particularly harmful. On the other hand, there has not been enough time to determine effects over a 20-30 year period.

The power companies are concerned about the negative effects of the higher water temperature and are funding a several-year study by the Illinois Natural History Survey on the effects of the heated water.

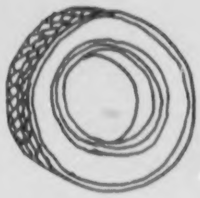
Two of these lakes, which offer recreational benefit to the public are:

- Baldwin Lake--on the Randolph County-St. Clair County line
- Lake Sangchris--in western Christian County, southeast of Springfield.

V. Tires

Tires are often troublesome to dispose of. They are a problem in sanitary landfills because they work up to the surface when the fill is settling and are resistant to natural decomposition. Are there ways to turn them from a problem into a resource?

Some tires, of course, are retreaded, and this number could be increased. With care, more tires removed by the retailer would not be damaged beyond being retreadable. If the consumer would trade in tires while they still have 1/16 inch of tread, the percentage of tires discarded in retreadable form would increase more than one-third. The market for retreaded tires is limited, however.



Current experiments offer promise for reclaiming some of the chemical constituents of tires and recycling them into new synthetic rubber. Other encouraging experiments, though not yet conclusive, use chopped rubber as an aggregate in roadbeds and as an asphalt additive in the surface itself.

Used tires have long been used on highways and docking facilities to absorb the energy of impact, on sand dunes and river banks to control erosion, and for retaining walls and ground cover to control soil erosion. Some of these uses may be aesthetically objectionable, however, if used excessively.

Tires have a high heat content and some of the resource recovery systems now being developed will make good use of this energy.

THINGS TO DO:

- Start a compost pile if you do not already have one; if you have been including bags of grass clippings and leaves with the rest of your solid wastes, seriously consider ways to turn them into fertilizer.
- Find out if sludge is available from your sanitary treatment plant. If so, consider using it. If not, determine if it could be made available. (See note of caution in the section on Sludge in the chapter.)
- Look around your community or county to see what examples you can find of wastes being used as resources.
- Try to urge others to use wastes as resources. If you have an idea for using wastes constructively, consider starting a small business alone or with one or more others.
- Encourage groups to work for state (and perhaps federal) legislation to encourage the reclamation and re-use of resources from solid wastes and development of markets for reclaimed materials, and to provide economic incentives to make reclaiming materials attractive.

Do not be misled into believing that we can do away with landfills. For rural areas they are the only environmentally acceptable solution (because of energy required to assemble waste in a central, large-scale operation). Also, there will be some residue that must be put some place.

- Ask local and county officials about the feasibility of regional waste recovery.
- Appear at local meetings and public hearings and speak up in favor of resource recovery schemes.
- Try to understand the arguments against such schemes and suggest positive measures.
- Work alone or with others to plan a photo exhibit of wastes as resources, perhaps at your public library. You may want to contact several groups that might have an interest in this subject.
- Learn about the salvage industry; begin with references in your public library.
- Learn how manure from feedlots is used as fertilizer.
- Learn how methane gas is produced and how it can be used.

BOOKS TO ENJOY:

Large, David B. (ed). Hidden Waste: Potentials for Energy Conservation. The Conservation Foundation, Washington, D.C., 1973. Out of print.

National Association of Secondary School Principals (NASSP). Resource Recovery and You. Resource Recovery Education Program. Kit includes teacher's overview, 3 teacher's guides (for science, social studies, and industrial arts), wall chart illustrating recycling, 3 student manuals. 1974. $12.00 ppd. Order from NASSP, 1904 Association Drive, Reston, Virginia 22091.

Rodale Press, Inc., Educational Services Division. Recyling. Organic Classroom Series. 1973. $1.50. Rodale Press, Emmaus Pa., 18049.

Schatz, Albert and Vivian. Teaching Science with Garbage. $1.50. Rodale Press, Emmaus, Pa., 18049.

U.S. Environmental Protection Agency. Energy Recovery from Waste (City of St. Louis). 1973. Free. Order from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402.

U.S. Environmental Protection Agency. Incentives for Tire Recycling and Reuse. No stock number or price given.

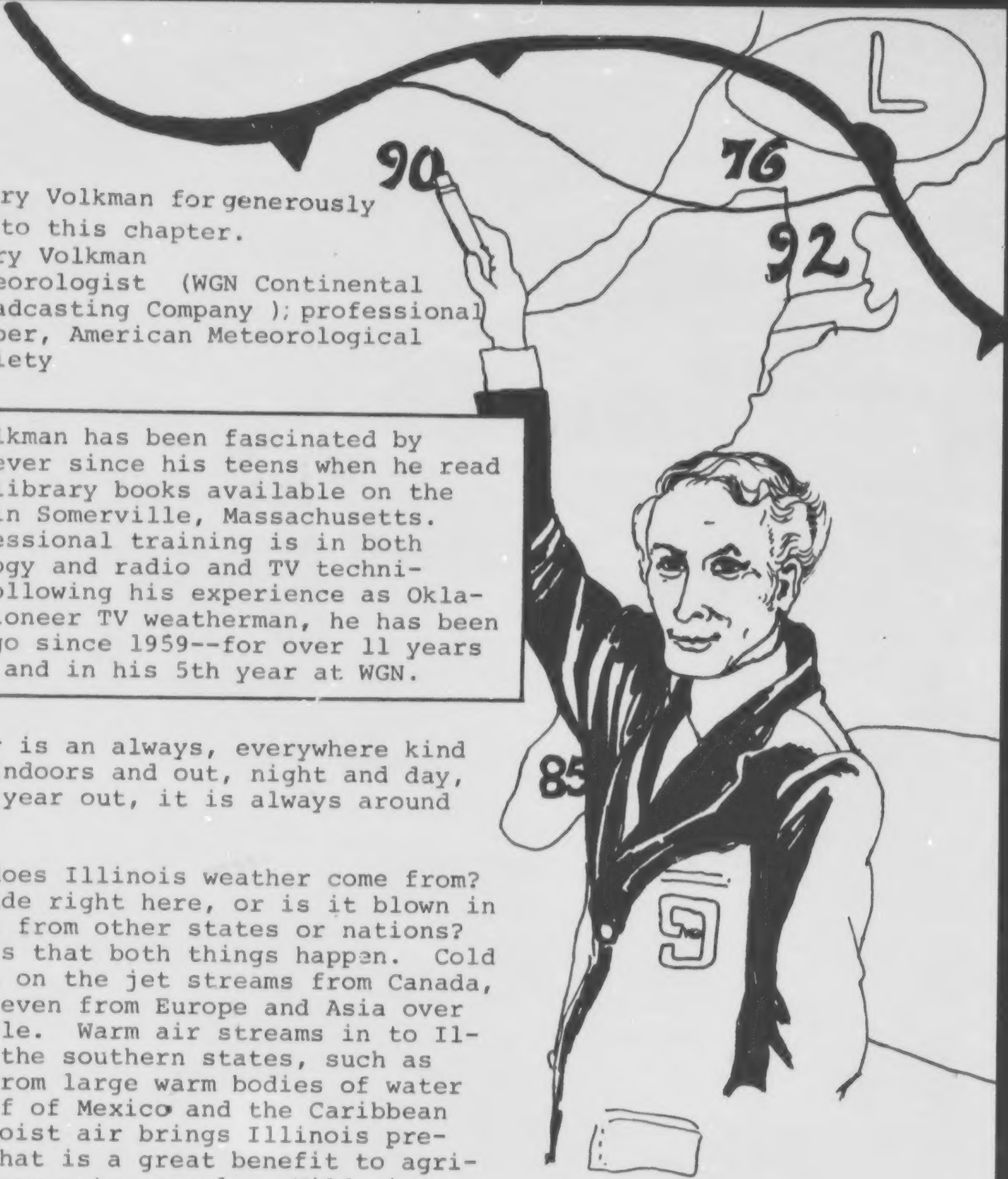
U.S. Senate, Committee on Interior and Insular. Readings on Energy Conservation. Selected materials compiled by the Congressional Research Service at the Request of Henry M. Jackson, Chairman. (pursuant to S. Res. 45, The National Fuels and Energy Policy Study. 1975. Serial No. 94-1 (92-91). $4.80. Order from Supt. of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

Weather

Thanks to Harry Volkman for generously contributing to this chapter.

Harry Volkman
Meteorologist (WGN Continental Broadcasting Company); professional member, American Meteorological Society

Harry Volkman has been fascinated by weather ever since his teens when he read all the library books available on the subject in Somerville, Massachusetts. His professional training is in both meteorology and radio and TV techniques. Following his experience as Oklahoma's pioneer TV weatherman, he has been in Chicago since 1959--for over 11 years with NBC and in his 5th year at WGN.



Weather is an always, everywhere kind of thing. Indoors and out, night and day, year in and year out, it is always around us.

Where does Illinois weather come from? Is it all made right here, or is it blown in by the winds from other states or nations? The answer is that both things happen. Cold air comes in on the jet streams from Canada, Alaska, and even from Europe and Asia over the North Pole. Warm air streams in to Illinois from the southern states, such as Texas, and from large warm bodies of water like the Gulf of Mexico and the Caribbean Sea. This moist air brings Illinois precipitation that is a great benefit to agriculture and our water supply. Mild air sometimes comes to us all the way from the Pacific Ocean, over the peaks of the Rockies, across the Great Plains over our prairie state. When these air currents meet each other over the state of Illinois, sometimes violent changes occur--a storm or rain, snow, or tornadoes may develop. So we see that the weather here in Illinois may form from air that comes from afar.

There are few influences that moderate the weather in Illinois. Oceans and tall mountain ranges, which greatly in-

fluence weather and climate, are too distant from Illinois to have much effect. Actually, Lake Michigan is the only weather modifier of any size, and its effects are not felt very far from the lake shore.

Weather varies considerably from the northern to the southern parts of the state. Summer weather ranges from humid and warm in the north to humid, subtropical, and hot in the extreme south.

Illinois has four definite seasons caused by the steady month-to-month changes of the strength of the sun's rays and the length of days. Extremes of temperature range from above 100° Fahrenheit (40° Celsius) in the summer to 20-30° below Fahrenheit (30° below Celsius) in the winter. Snowfall ranges from about 45 inches annually in northwest Illinois to only about 13 inches in the extreme southern part of the State. Storms that cause precipitation (rain, snow, sleet, hail, drizzle) are giant whirlpools of low pressure that are like mixing bowls spinning aloft in the westerly winds. As they pass over the State, they may be on their way from the Aleutian Islands, where they are formed, traveling through on their way to the Atlantic Ocean, and finally dying out in eastern Europe. The storms are tracked by weather observers using balloons, radar, satellites, and just their eyes on land and ship stations.

The daily lives of many people are affected by the weather--farmer, rural and small-town resident, and city dweller alike. Those who grow anything from vast crops to tiny garden plots may anxiously scan the sky or listen to or read weather forecasts. People who enjoy outdoor sports have more than a passing interest in what the weather will be. Many kinds of jobs keep people outdoors a great deal, with the weather making their jobs easier or harder:

- repair and maintenance workers
- airplane pilots
- salesmen, delivery men, long-distance truck drivers
- people who drive more than a short distance to work.

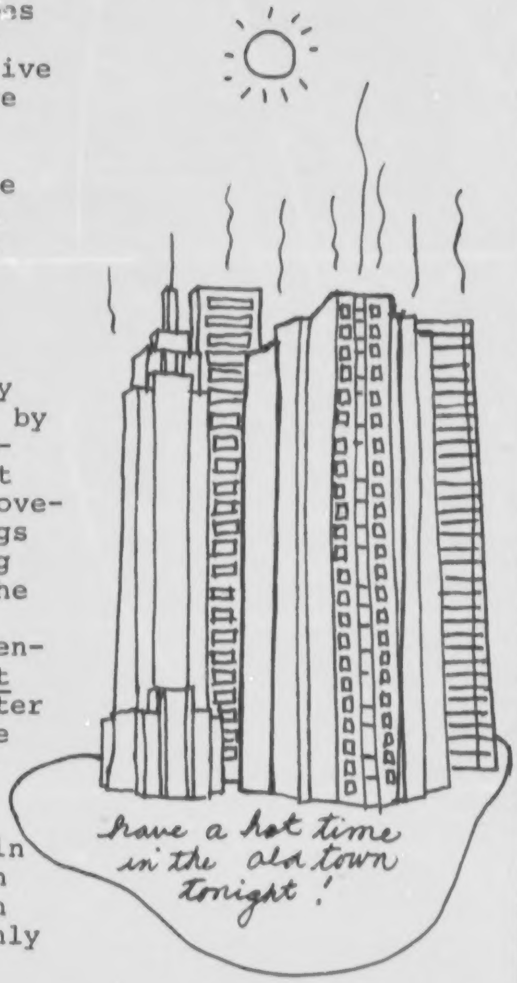
Knowing what weather to expect is important to them.

A fascinating, but disturbing, factor about weather is its unpredictability from week to week and sometimes even from day to day and thus the difficulty of forecasting. Although meteorologists may successfully predict the weather up to five days ahead, they are right only about 85% of the time for the first two days and only half right the last three days. Why do they even try? They do because it is very helpful when they are right, and correct forecasts can make life much pleasanter and more convenient for those who plan their activities around the weather forecast. Until the day comes when we will be able to change the weather ourselves--and it may--we shall have to learn to live with weather better, while continuing to improve our forecasting.

If successful long-range forecasts are able to be made some day, it will help our state and nation to plan more wisely the distribution and use of their precious fuel supplies.

Comments on Weather by Virginia A. Stehney

Weather is both inadvertently and purposely modified by people. Wind direction is affected by the topography of the land and by local obstructions such as buildings. City buildings may not only obstruct wind but also cut down the free movement of large masses of air. The large buildings of cities absorb more energy from the sun during the day and hold onto it longer at night than the few buildings, trees, and open spaces of the countryside. This tendency of warm air to concentrate in the center of cities is called the heat island effect. The warm air rises from the center of the city, and cooler air from the edge of the city replaces it. Thus, air circulation occurs within the city caused by the sun heating the larger buildings in the center of the city. If city air is dirty, this pattern of airflow within the city will result in increased pollution. On windless days, it continues within the city with the air growing "thicker" and more polluted. Only a strong wind can alter it.


have a hot time in the old town tonight!

As you may have noticed from newspaper articles and TV reports, there is increasing concern about the effect on people of ozone in the air. Some experts say the ozone level in cities, and even away from urban areas, is increasing. Others say ozone is being recognized as a problem because of better ways of measuring it. Ozone is formed from the action of sunlight on air pollution, especially on the hydrocarbons and oxides of nitrogen. This is called photochemical smog. These pollutants came from auto exhaust and from the burning of fossil fuels (coal, natural gas, and oil) used to heat buildings. In the summer ozone levels may become high when the sun's rays are strongest and more likely to cause chemical reactions of the pollutants. In the summer of 1975 Chicago was having more ozone watches then the previous year. Some experts said they believed that was due to the weather--more sunlight and lack of wind rather than an increase in pollution sources.

That old saying that everyone talks about the weather but no one does anything about it is no longer true. Did you know that weather can be changed, that rainfall can be increased and hailstorms partly suppressed?

This is called weather modification and is being done in Illinois. Weather modification is quite complex. Increased rainfall at the right time for Illinois crops of corn, soybeans, and wheat seems to be desirable. However, there are ecological, economic, and social implications to be considered.

In 1973 the Illinois General Assembly passed the Weather Modification Control Act whose objectives are to:

> "encourage weather modification operations, research and development, and to minimize possible adverse effects of such activities. It allows persons to be licensed by the Department of Registration and Education as weather modifiers and provides for permits to be issued for specific operations. A Weather Modification Board advises the department on rules and regulations. The Board is composed of five persons with qualifications in agriculture, law, meteorology, and water resources. Members are appointed by the director of the Department of Registration and Education."*

Extensive research has been carried out by the Illinois State Water Survey, by a project at the University of Chicago, and by Metromex, a large-scale investigation of inadvertent weather modification in an urban area, sited at St. Louis. Research has been done on the effects of natural phenomena on the weather and of inadvertent changes caused by cities and industries.

Is it possible that increasing rainfall in one place will cause less somewhere else? Research has indicated that:

*Illinois Issues, July, 1975, p. 197.

"An examination of the amount of precipitation well downwind of major cities (St. Louis and Chicago) does not reveal any 'downwind' increase or decrease in rainfall." This concern is further refuted by the "small amount of atmospheric water that falls as rain in Illinois... only five percent of the enormous 2,000 billion gallons of moisture that passes over Illinois daily falls as rain. Moreover, 60 percent of this (or three percent of this 'atmospheric river') returns to the air through evaporation from Illinois water bodies and plants. A 20 percent increase in annual rainfall over the entire state would represent use of only one percent of the atmospheric river, and more than half of this would be returned to the air by evaporative processes."*

The subject of increasing rainfall at the proper time in an agricultural state like Illinois is of great importance. Watch for more information on this subject in the newspapers and on television. You might want to ask your state representatives about this legislation.

Rainfall can be increased by a scientific approach called "cloud seeding". Dry ice, water spray, salt particles, or other substances may be dropped from an airplane into a cloud to "seed" it. Or silver iodide "seeds" may be released from the ground and carried into the clouds by the wind. If the situation is favorable, tiny drops of water from the cloud gather around each "seed" and fall to the earth as rain. It is easy to see possible economic advantages to farmers of cloud seeding. What political-social implications do you see?

THINGS TO DO:

- Listen to TV weathermen; try to learn about weather forecasting.
- Find a good reference book and become an amateur weatherman by learning to:
  - recognize the many types of clouds
  - estimate the wind
  - recognize simple weather signs
  - read the weather map in the newspaper
  - learn to read a barometer.
- Discuss the effect of weather on various jobs: farmer, pilots, baseball players, and so on.

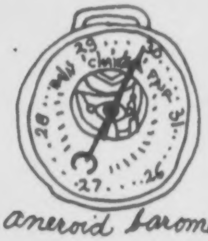
---

*Ibid.

In 1960 the first U.S. weather satellite was launched to send back photographs of the earth's weather conditions. The use of such satellites along with many weather information-gathering land and sea stations provides information for making long-range weather forecasts.

- Learn about weather satellites.
- Make simple weather instruments, using directions from a good children's book from your public library:
  - a pinwheel can be a simple anemometer (to measure wind speed)
  - for a rain gauge, put an uncovered, empty coffee can (or any container with straight sides) outdoors; after a rain, measure the rain water in the can with a ruler.
- Do research on the practice of seeding clouds to produce rain; consider political ramifications of this practice.
- Study cloud charts; keep record of clouds on various days and any changes during the day; notice weather that accompanies these clouds.
- Locate a weather station you can visit--at a school, university, laboratory, etc.
- Investigate some of the weather lore; test some of the old sayings to see if they are reliable; an example is:

  Red skies at night
  Sailors' delight;
  Red skies in the morning
  Sailors take warning.
- A class may want to list jobs that are affected by weather.



aneroid barometer

THINGS TO WATCH FOR:

--whether the barometer is rising or falling
--which way the wind is blowing

In general, when the barometer is high, the weather will get better; when it is low, the weather will get worse.

Learn about Indian rain dances and other early western "rainmakers".

BOOKS TO ENJOY:

Simpler References--for adults as well as children*

Bendick, Jeanne. How to Make a Cloud. Parents, 1971. Primary. $4.00.
Bova, Ben. Man Changes the Weather. Addison-Wesley, 1973. Intermediate grades-up. $4.
Bova, Ben. The Weather Changes Man. Addison-Wesley, 1974. Grade 5-up. $5.50.
Gallant, Roy A. Exploring the Weather. Doubleday, 1969. Grade 5-up. $4.25.
Iger, E.M. Weather on the Move. Young Scott, 1970. Grade 6-up. $3.50.

*some old but still accurate

Knight, David C. Let's Find Out about Weather. Watts, 1967. Primary. $3.50.

Spar, Jerome. The Way of the Weather. Creative Education Soc., 1967. Intermediate grades-up. $6.50.

Stone, A. Harris. The Winds of Weather. Prentice-Hall, 1969. Grade 5-up. $4.

OTHER REFERENCES:

Changnon, Stanley A. Jr., "Changing the Weather: Implications for Illinois," Illinois Issues, July, 1975, pp. 195-197.

Frisken, William R. The Atmospheric Environment. Resources for the Future, 1973 (includes information on heat islands from cities, changes in wind patterns, effects of aerosols, water vapor, carbon dioxide)

Illinois State Water Survey. Summary Report of Metromex Studies, 1971-1972. Report of Investigation 74. Urbana 61801, 1973. (Metromex is a large-scale investigation of inadvertent weather modification in an urban area, sited at St. Louis.)

Illinois State Water Survey. Causes for Precipitation Increases in the Hills of Southern Illinois. Report of Investigation 75. Urbana 61801, 1974.

National Tuberculosis and Respiratory Disease Association. Air Pollution Primer. 1969. Order from Chicago Lung Association, 1440 W. Washington, Chicago Il 60607 (Chapter 1--Air, Weather, and Pollution)

U.S. Department of Commerce. Inadvertent Modification of Weather and Climate by Atmospheric Pollutants. 1970. ESSA Technical Report ERL 185-APCL 15. (Technical but good overview.) Order from U.S. Government Printing Office, Washington, D.C. 20402.

United States Senate, Subcommittee on Communications and Power. Weather Modification and Early-Warning Systems. (Hearings, 1974). Order from U.S. Government Printing Office, Washington, D.C., 20402.

United States Senate, Subcommittee on Oceans and International Environment. Weather Modification (Hearings, 1974). Order from U.S. Government Printing Office, Washington, D.C. 20402.

Who Makes Environmental Decisions ?

OFFICE OF TH

The more thought given to the question of who makes environmental decisions, the more complex, far-reaching, and intriguing the subject becomes.

Choices that determine our environmental quality are made daily. The decisions may be:

personal
family
community
business or corporate
county
regional
state
national
international

At the personal and family levels, decisions are generally made informally. Then, as a greater number of people are affected, as more money is spent, as a wider geographic area is involved, more people are drawn into the decision-making. The process now becomes more formal and time-consuming and takes longer to complete.

The decision-making process may include any or all of the following aspects, especially above the personal/family levels:

What are the choices?
Who chooses?
What criteria are used?
Who carries out the decisions?
What review or evaluation is planned?

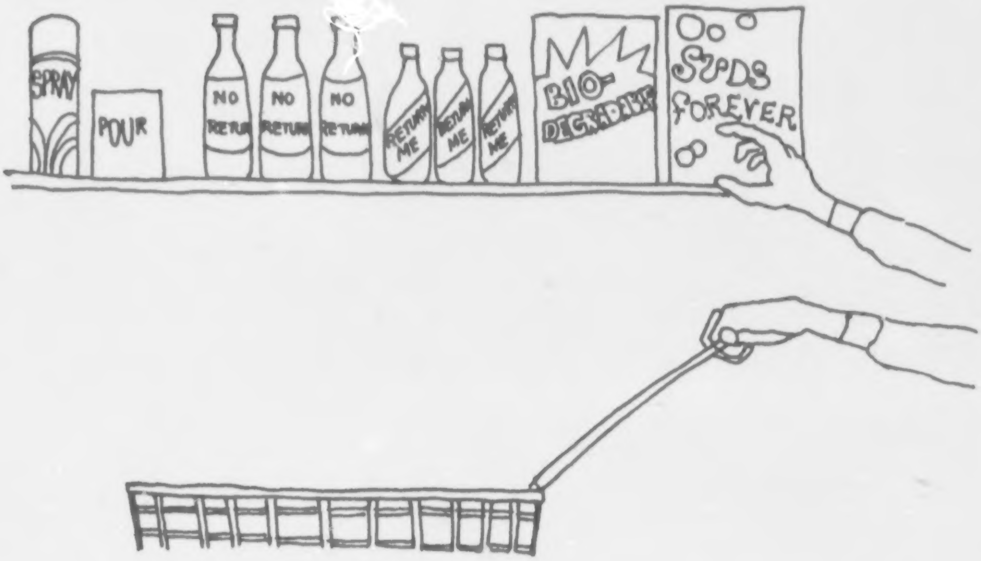
Personal/Family Level

Even a young child has an effect on his envi-

ronment, consciously or unconsciously, in such simple, every-day actions as these: throwing a candy wrapper or soft drink can in a proper container versus throwing them on the grass in a park or street; respecting trees, bushes, and flowers in yards and parks versus damaging them, observing rather than killing insects.

Individuals and families make dozens of choices daily or in the course of a week or month which affect the environment in different ways:

- use of a car--efficient, wasteful, or in-between
- walking or riding a bike or taking a (school) bus or train, instead of driving a car.
- purchase of products for the home--electrical appliances, products in aerosol cans, soft drinks and beer in throw-away cans or bottles vs. returnables, "over-packaged" items
- use of energy in the home--careful, careless, unconscious
- recreation which uses considerable energy and other resources or other, simpler (but perhaps equally enjoyable) activities.



Ocassional decisions having environmental impacts range widely and may include:

- whether to have a vegetable garden
- whether to have a compost pile vs. bagging leaves and grass and getting rid of them with other solid wastes, or some other alternative
- whether to use chemical or natural fertilizers
- what car to buy when one seems needed
- whether to buy a motorbike or snowmobile purely for recreation

- what new home to choose--location (near stores, transportation, or schools?), one with all-electric kitchen? limited electric appliances? very good insulation?

For many of these decisions, people often seek advice from relatives, friends, or neighbors. Some people may look at consumer information which compares products. Individual or family decisions are influenced by how individuals feel about themselves and about others, their concern (or lack of concern) for the environment, the strength of their desire to possess material things, their response to advertising which urges them to buy and consume more. The many purposes of advertising include information about new products and services. You may want to listen carefully to TV and radio advertising and look closely at newspaper and magazine advertising. How much is informative? How much promotional? When you listen to TV for several hours, you may want to try to determine what percentage is information, what percentage is promotion, what percentage is mixed.

Great cultures in the past have usually paid attention to where they came from and where they were going. In our society the trend has been increasing toward seeking immediate gratification and satisfaction of desires. Many people who live for today are more likely to consume in excess and give little or no thought to the environmental consequences or long-term results of their consumption.

Let's take an example of environmental considerations for a family who wants to buy some kind of small water craft. Compare a canoe or row boat with a motorboat for:

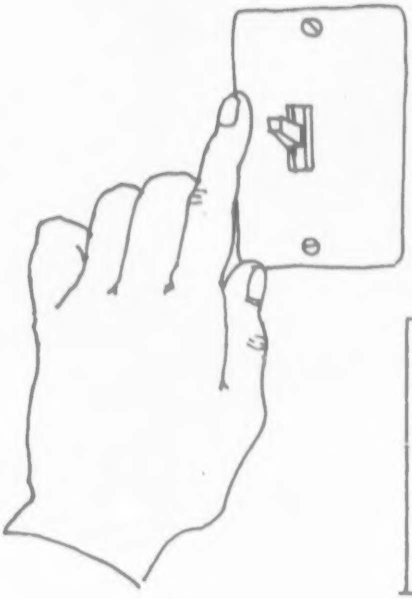
- energy and other resources used in its manufacture
- energy and other resources used in its maintenance
- effect on the environment--noise, fuel, disturbance of marine habitat
- advantages from point of view of exercise, mobility, esthetics.

What conclusions can you make?

When there are differences of opinion in families over what choices to make, how is the decision made? While this procedure may vary with families, it would seem that most conclusions at this level are not the result of formal considerations and a democratic process.

LET THE MOTOR DO THE WORK

THINGS TO DO:



▶ Think how decisions are made in your family; discuss various ways other families make decisions.

▶ Consider recent decisions you or your family has made; what environmental effects have these decisions had?

▶ Discuss what would happen if decision-making on the town, county, and other levels occurred in the same way most individual and family decision-making occurs? What if such decisions were made arbitrarily? How might the condition of our environment be different?

CAN YOU DO THIS?

Using environmental concerns you may have, such as dangers of aerosols and pesticides, consider decisions you make involving them; determine alternative actions. Is it possible for you to keep your environmental concerns in mind more when making day-to-day decisions?

Business and Industry

Businessmen individually may make environmental decisons such as beautification of an area, remodeling of a building, or putting in a parking lot. Individually or through their organizations they may try to influence town and county boards concerning approval or rejection of shopping centers, improvement of roads, expansion of an airport.

One main objective of business and industry is to increase business and to make profits. Another objective is to meet the needs of the consumer. Historically, environmental concerns have received secondary or negligible considerations. Recently, enlightened attitudes on the part of corporate management, concern with corporate image, and/or necessity to meet government standards have led business and industry to balance the costs of environmental protection against other benefits they seek.

Government sets certain minimum standards for many kinds of projects, and in the last few years has been imposing sanctions. Corporate concern with environmental protection has usually followed widespread recognition of some clear and present threat to public health or well-being. The courts in our country review such governmental action and protect private interests. A corporation, for example, may have to decide:

- whether it is possible and worth meeting the environmental standards
- whether to try to change the standards--or perhaps to push for an extension of deadlines,
- or whether to discontinue a particular product or process.

The uncertainty of being able to meet standards and of having standards change, is upsetting to business and industry. Plans, including investments, have to be made years in advance. Once decisions are made, it may be difficult, and expensive, to change. However, increasingly business and industry are having to include the cost to the environment in the cost of a service or product. More and more, citizens are not accepting that society as a whole should pay the cost of cleaning up the environment polluted by individuals or corporations. Citizens want to require that the cleanup be paid as a part of doing business or as an added cost to be paid by the consumers of the products of that particular business.

Town, County, or Regional Levels

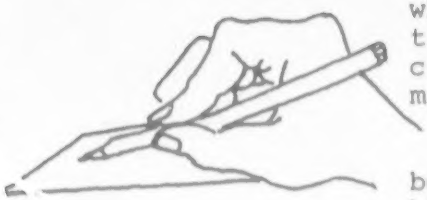
Most decisions at these levels have an environmental impact, and many of these are concerned with land use. There are various councils, boards, and commissions which make up our government at these levels. (See the following yellow pages for a chart.)

KNOCK
KNOCK

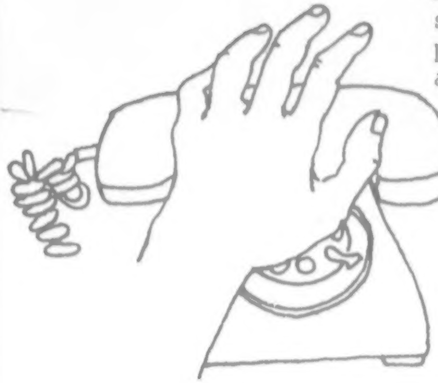
Often citizens want information, such as:

- sites being considered for a sanitary landfill
- plans for a shopping center proposed for an area near their home that, while adding to the tax base, will also add considerable traffic (and necessitate the building of wider and "better" roads), noise, and runoff water to the area
- plans for a proposed subdivision, perhaps in an area that often floods.

Where might you go for such information? You may think of elected officials first of all. In small towns and rural counties, elected officials may work only part-time at their "official" jobs, perhaps evenings and week-ends (though they may be available at their regular jobs during the day) while a few, such as a village clerk, may be full-time. In more heavily-populated counties and large cities, of course, more officials work full-time and may be reached at their offices.



In addition to elected officials, the many boards, commissions, and councils meet on a regular basis. If you wish information on meeting dates and times of any governmental body, your town or county clerk will give it to you. In Illinois the Open Meetings Act, passed in 1967 with the current version effective in 1973, provides that meetings of public bodies be open, with certain exceptions such as when land acquisition is being considered.



> Public Law 102, section 28, 41. § 1 states: "It is the public policy of this State that the public commissions, committees, boards, and the other public agencies in this State exist to aid in the conduct of the people's business. It is the intent of this Act that their actions be taken openly and that their deliberations be conducted openly..."

Some decisions are much better made on a regional basis, for example, those concerning water problems in a watershed. Increasingly, coalitions of existing organizations and agencies form to make regional plans, with more attention given to environmental consideration. If federal funds are available, the required environmental impact statement may facilitate more environmentally-responsible decision-making.

It is often very difficult to identify how and where decisions are made. You may want to try to find out the unwritten policies on which decisions are based in your community or county. Once you can describe what the policies are, you ought to ask if they are actually still appropriate to the needs of the community and what alternatives there might be.

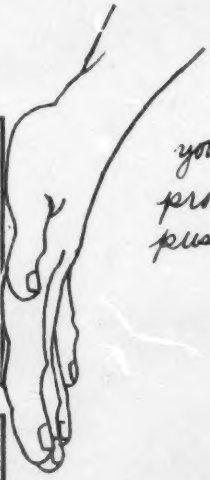
At times, at most levels of government, people who influence decisions may not be visible. Moreover, reports (which have great bearing on decisions) may be withheld from the public. The average citizen or group may have trouble getting information that is complete and accurate and may not know how to make their wishes known. Fortunately, there is less hidden influence today than formerly.

Citizen Action

If you as an individual or member of a group should find what seems like secret vested interests, you should call public attention to the situation. Talk to reporters, if necessary.

Citizen action is a responsibility that citizens in our country should take seriously. It is basic to the political philosophy of the United States that the people have the right to make the final decision.

WHAT DO YOU THINK?



you can provide the push

It has been said that many government officials seem to need a hard push and a lot of input from their constituents to realize that our natural resources are not endless and that many citizens are willing to sacrifice, if necessary, to have a quality environment which can be passed on to our successors on this earth. Do you agree? If so, do you act on this belief?

Do you believe that people get the government they deserve? For many reasons Americans have been turned off by politicians and government. (You have only to look at the figures on voter turnout in recent elections to see this clearly.) Our government is a democracy--OF THE PEOPLE
BY THE PEOPLE
FOR THE PEOPLE.
Thus every citizen has a right to be involved in the planning process which affects his town or county. Along with this right goes a respon-

sibility to consider the needs and desires of fellow citizens and the effect of such plans on the environment.

If citizens take a more active part in the democratic process, there is certainly more chance that this great experiment in democracy that is going on in our country will really work.

THINGS TO DO:

SAVE
OUR
AIR/WATER/
LAND

- Identify something in your local environment that is changing, perhaps land that is being considered for a park; try to find out whose and/or what decisions lead to this change.
- Find out if your local government or park district or county has a plan for the future.
- Think about or discuss: Is your community an old one? a new one? a stable one? a rapidly changing community? Can you tell what or who caused the changes?
- Attend meetings of boards or commissions on specific subjects; learn how they work; get acquainted with the members; let them know your stand on issues (after you inform yourself, of course); watch your local newspaper for reports of meetings.
- If there are some environmental problems that you feel should be brought to the attention of your local newspaper, a local official, your state representatives or senator, or your Congressman, do it--with others or alone; in person or by letter, phone, or public opinion telegram of Western Union.
- Join or organize a group to work for environmental issues.

State Level

A great number of decisions affecting the environment are made on the state level. In 1970 an excellent environmental law was passed in Illinois, one of the best in the nation--the Illinois Environmental Protection Act. This law sets up three agencies to give thorough attention to environmental quality in our state:

Environmental Protection Agency--has responsibility for surveillance and enforcement in five divisions: water pollution control, land pollution control, air pollution control, public water supplies, and noise pollution control.

Pollution Control Board--sets quality standards, judges complaints of violations, and considers requests for variances

Institute for Environmental Quality--as the research arm of this program, commissions studies and compiles sound background data on pollution problems and effects and possible solutions; funds environmental education research projects.

In the Second Annual Report of the Council on Environmental Quality*, August, 1971, it was stated that: State Governments are moving boldly. From New York to Illinois to the State of Washington, the machinery for policy-making and for administration of environmental programs has been reformed and strengthened (p. vi). Illinois (has) created new agencies and combined old ones in an effort to relate more effectively the functions of government to the problems of the environment. (p. vii). "Reorganization of environmental programs such as those in New York, Washington, and Illinois... should significantly accelerate substantive progress at the State level." (p. 54)

Though their mandate is not entirely environmental, many other state agencies have some environmental responsibilities. Citizens may obtain information and other kinds of help from them. (See list on following yellow page.) The responsibilities and staff structures of these agencies change, so it may be difficult to decide where to go for information. However, approach the most likely agency and, if necessary, they will refer you elsewhere.

National Level

In 1970, the National Environmental Policy Act (NEPA) became law. This act is "a comprehensive national policy for restoring, protecting, and enhancing the quality of the environment." Its objective is to incorporate an environmental perspective into the decision-making process of federal agencies and to pay more attention to trade-offs between short-term gain and long-term environmental quality. Before this time, each agency acted according to its own enacting legislation, as interpreted by that agency.

Congress then ordered that agencies prepare an

*of the Office of the President

environmental impact statement in connection with every major action which significantly affects the environment. This mandate required a new way of thinking and acting by executive agencies of the federal government.

When environmental impact statements are prepared, several alternatives are still possible and are publicly discussed. Impact statements can facilitate a more balanced judgment. At times, however, they may be used to delay projects.

The Council on Environmental Quality of the Office of the President judges how well agencies conform to the NEPA. They publish excellent annual reports (See list at end of chapter).

THINGS TO DO:

- Learn (by contacting local, county, or state officials or agencies) what projects affecting you have had NEPA statements. Is the project any better because of this extra environmental study? How? Or if not, why not?
- If you have an informal complaint about specific pollution sources, you can make it directly to the Clerk of the Illinois Pollution Control Board, 309 W. Washington, Chicago 60606. The Clerk will send a copy of the complaint to the Illinois Environmental Protection Agency and request a response. He will also notify the individual making the complaint of his right to initiate an enforcement proceeding and will provide a form for a formal complaint.
- If you wish to:
  - elect candidates who support certain issues
  - support referenda
  - get petitions signed to show support for issues
  - have a basic effect on democratic decision-making,

  remember that grassroots, precinct work is where you can have the greatest influence. Precinct maps and lists of registered voters are available from your county clerk or election commission.

PRECINCT MAP
PETITION
list of registered voters

- If you or your group need technical help with a problem, try and locate a (volunteer) expert in your community. Consider how you might involve this expert if you go to decision-makers. You may want to contact state agencies for technical help of some kind.

▶ If you wish to influence corporate environmental decision-making, buy stock in a company and go to the annual stockholders' meetings.

BOOKS TO ENJOY:

For information on environmental topics--

1) try your public library first; remember that they have access to additional materials through the regional library systems
1) write to the Midwest Environmental Information Center, United States Environmental Protection Agency, 230 S. Dearborn, Chicago 60604 for information on specific subjects.

Citizens Advisory Committee on Environmental Quality. Citizens Make the Difference. Case Studies of Environmental Action. January, 1973. Available from the Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. Stock No. 4000-00290. $1.75 ppd.

Council on Environmental Quality, Office of the President. Annual Reports available from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402 (quite readable for the layman; not technical)

- Environmental Quality. The First Annual Report. August, 1970. No stock number. $1.75.
- Environmental Quality. The Second Annual Report. August, 1971. Stock No. 4111-0005. $2.
- Environmental Quality. The Third Annual Report. August, 1972. Stock No. 4111-0011. $2.
- Environmental Quality. The Fourth Annual Report. September, 1973. Stock No. 4111-00020. $4.30.
- Environmental Quality. The Fifth Annual Report. December, 1974. Stock No. 4000-0037. $5.20.

Fritsch, Albert J. The Contrasumers. A Citizens Guide to Resource Conservation. Praeger, 1974. $3.50. High school - up.

Illinois Institute for Environmental Quality. Illinois Directory of Environmental Information containing lists of environmental groups in Illinois, neighborhood recycling centers, and markets for recyclable mate-

rials. March, 1975. Available from the Institute, 309 W. Washington, Chicago 60606. Phone: 312-793-3870.

National Education Association. *Today's Education*. November-December, 1974. "Citizen Action Can Turn Things Around" by John W. Gardner. NEA, 1201 - 16th Street, NW, Washington, D.C., 20036.

U.S. Environmental Protection Agency. *Citizen Action Can Get Results*. August, 1972. Available from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. Stock No. 5500-0070. 20¢.

U.S. Environmental Protection Agency. *Don't Leave It All to the Experts*. The Citizen's Role in Envirormental Decision-Making. Nov., 1972. Available from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. 55¢.

U.S. Environmental Protection Agency, Region V, Office of Public Affairs. *Midwest Environmental Directory* (revised regularly). Request from U.S. EPA, Midwest Environmental Information Center, 230 S. Dearborn, Chicago 60604.

ORGANIZATION CHART OF AMERICAN GOVERNMENT

Note: At the state and federal levels the executive and legislative functions are separate. At municipal, township, and county levels, the elected officials have a mixture of executive and legislative functions--responsibilities in making and carrying out policies.

National

President (elective; full-time)
2 Senators (elective; full-time)
1 Representative from each Congressional District (elective; full-time)

State of Illinois

Governor (elective; full-time)
General Assembly
  Senate--1 per district; elective

  House--3 per district; elective

Departments and Agencies (directors are appointed by Governor ;full-time)

"In Illinois, it has been traditionally assumed that most activities are best carried out by small groups of people with common interests, and that government should be a minimal part of society." As a result Illinois has 102 counties, 1,267 municipalities, over 1400 townships, and more than 3000 single purpose units such as school, fire protection, and other special districts, most of which have some taxing or fee-collecting powers..."The total--over 6,400 units of local government--exceeds any other state."
(from Solid Waste Management in Illinois. Volume 5: The Plan, Illinois Institute for Environmental Quality Document No. 74/55. p.l.)
How might this decentralized organization affect decision-making?

County

County Board members (elective; part-time)
  Standing Committees (with appointed volunteers), such as:
    Building and Transportation, Planning, County Buildings, Public Works (landfill, drainage, airport), Roads, Zoning, Zoning Board of Appeals, Regional Planning Commission
  Forest Preserve District
    ex-officio county board members

Township

Township Board (elective; part-time)
  Auditor
  Assessor
  Supervisor

Municipal Government

Town Board or Council, Village Board or Council
  (elective positions)--may have (appointed volunteers)
  Architectural Commission
  Environmental Commission
  Flood Plain Board of Appeals
  Park Board (or may be autonomous district)
  Plan Commission
  Recreation Department
  Zoning Commission
  Other?
  and a paid staff

Single-purpose Districts

School Board--elective;
  volunteer
  elementary, high school or unit district
  paid staff

Park Board--elective; volunteer
  autonomous district if not part of municipal government
  paid staff

Sanitary District--
  autonomous but appointed by county board

Conservation District--in a few
  counties

For additional specific information on local government and names of current officeholders, check with your:

library
county clerk
township clerk
village or city clerk

A PARTIAL LIST OF STATE AGENCIES WITH ENVIRONMENTAL CONCERNS

Illinois' three main environmental agencies:

- Environmental Protection Agency--2200 Churchill Road, Springfield 62706; (217) 782-3397
  - a) Public Affairs Division--can answer questions about IEPA program and arrange for speakers (217) 782-5562
  - b) Library--is open to those in the area; can try to help on specific questions (217) 782-5082
- Illinois Institute for Environmental Quality--309 W. Washington, Chicago 60606 (312) 793-3870
  The Institute's Environmental Information Center is open to the public, and many materials may be borrowed. The collection is both technical and for the layman; there is a good sampling of environmental education materials.
- Pollution Control Board--309 W. Washington, Chicago 60606 (312) 793-3620

Other state agencies with environmental responsibilities as part of their mandate:

Department of Agriculture
  Division of Soil and Water Conservation, Illinois State Fairgrounds, Springfield 62706 (217) 782-6297
Department of Conservation
  State Office Building, 400 S. Spring, Springfield 62706, (217) 782-6302
  Bureau of Outdoor Recreation, Conservation areas, Division of Forestry, state parks, state fisheries
Department of Transportation
  2300 Dirksen Parkway, Springfield 62764, (217) 782-5597
Illinois Department of Business and Economic Development, Division of Energy--222 S. College, Springfield 62706, (217) 782-7500
Illinois Nature Preserves Commission
  819 N. Main, Rockford 61103, (815) 964-6666
Illinois Office of Education
  100 North 1st Street, Springfield 62777, (217) 782-5235, Dr. Lance Bedwell, Environmental Education Specialist, Instructional Services Section
Illinois State Water Survey
  P.O. Box 232, Urbana 61801, (217) 333-0237
State Geological Survey
  Natural Resources Building, Urbana 61801, (217) 344-1481; responsible for research and development on application of geology, chemistry, and mineral engineering and on the mineral resources of Illinois

State Natural History Survey
Natural Resources Building, Urbana, 61801, (217) 333-6880; conducts research on the protection and most intelligent use of Illinois' renewable natural resources

REMEMBER--

The staffs of your three state representatives and state senator are probably small but willing to help you find the right place to get information you seek. Let these elected officials know your stand on issues.

NATIONAL LEVEL

The federal environmental agency with a regional office in Illinois is:

U.S. Environmental Protection Agency, Region V--230 S. Dearborn, Chicago 60604, (312) 353-5250.

REMEMBER--

When you seek information or want to express your opinion, remember the offices of your Congressman and the two U.S. Senators from Illinois. If you are uncertain where to go for information, they will help you. Your local newspaper staff undoubtedly knows your Congressman's local address. Otherwise write to:

The Honorable ____________________ (Congressman)
House Office Building (or Senate Office Building
for Senator) Washington, D.C. 20510 (20515)

APPENDICES

GLOSSARY

bog - soft, waterlogged ground; a marsh, swamp

compost - a mixture of decaying organic matter, such as leaves and manure, used as fertilizer

ecology - the science of the relationship between organisms and their environments

ecosystem - an ecological community together with its physical environment

fen - low, flat, swampy land

forb - any herbaceous plant other than grass, especially one growing in a field or meadow

green island - an area in a community for the preservation of nature

green thumb - the ability to foster the growth and health of plants

incinerator - furnace or other apparatus for burning wastes

interpretive - explanatory

niche - the set of functional relationships of an organization of population to the environment it occupies; the area within a habitat occupied by an organism

organic - having properties associated with living organisms

peat bogs - a bog or swamp where peat has accumulated

prairie indicators - plants typical of a prairie

sanitary landfill - a method of trash and garbage disposal by filling in excavations and covering daily with soil

solid waste - trash and garbage

stewardship - responsibility for management

spaceship earth - concept of the earth as a closed system whose only resource replenished from outside the system is that of sunlight

swale - marshy meadow

tamarack bogs - bogs with tamarack trees (a kind of larch)

RESOURCES

People

There are many kinds of resource people in a community to whom teachers and youth group leaders can turn for help and advice. You may know some of them already. Many are happy to help and have the time, or they can direct you to others. A place to begin might be with the following organizations:

American Association of University Women (AAUW)--national and local concern for the environment
Audubon Society--their love and concern for wildlife is contagious
Earth Science Club of Northern Illinois (ESCONI)--especially for geological information
Garden Club--interest in plants and shrubs
League of Women Voters (LWV)--have a long history of environmental concerns; excellent publications.

There are other organizations with conservation and environmental orientation. Moreover, many people knowledgeable about aspects of the environment may not belong to any organizations. Ask around. Submit an article to your local newspaper describing what you are planning and requesting volunteers. No matter how you locate possible resource people, teachers may want to talk to them to determine whether they can communicate with children or others less knowledgeable.

Remember Senior Citizens or Older Citizens who might have ample time as well as special experience. They can provide a desirable contact with an age group which may not be available to some children within their families.

Agencies

Cooperative Extension Service, University of Illinois Mumford Hall, Urbana 61801
Illinois Department of Agriculture, Bureau of Soil and Water Conservation, Emmerson Building, Illinois State Fairgrounds, Springfield 62706.
Illinois Department of Business and Economic Development, Division of Energy, 222 S. College, Springfield 62706
Illinois Department of Conservation, State Office Building, Springfield 62706
Illinois Environmental Protection Agency, Citizens Assistance Division, 2200 Churchill Road, Springfield 62706; has speakers bureau; write or phone for information on materials; (217) 782-5562

Illinois Geological Survey, Urbana 61801 and P.O. Box 1, Warrenville 60555.

Illinois Institute for Environmental Quality, 309 W. Washington, Chicago 60606; has general and technical information for all age levels; library open to the public; for information, write or phone (312) 793-3870.

Illinois Natural History Survey, Natural Resources Building, Urbana 61801.

Illinois Office of Education, 100 N. First Street, Springfield 62777.

Illinois State Archeological Survey, Champaign 61820.

Illinois State Water Survey, P.O. Box 232 Urbana 61801 and P.O. Box 1, Warrenville 60555.

Northeast Illinois National Resource Service Center, Thornhill Building, Morton Arboretum, Lisle 60532.

Northeastern Illinois Planning Commission, 10 South Riverside Plaza, Chicago 60606.

U.S. Department of Agriculture, Soil Conservation Service--see phone book for nearest office or ask telephone information.

U.S. Environmental Protection Agency, Public Affairs Office, 230 S. Dearborn, Chicago 60604--their Midwest Environmental Information Center is the best service in Illinois for free pamphlets and charts.

Organizations

League of Women Voters of Illinois, Citizens Information Service, 67 E. Madison, Chicago 60603; ask for catalog of publications; and check your public library--many local leagues supply their local public libraries with current publications.

Open Lands Project, 53 W. Jackson, Chicago 60604; private, non-profit organization offering land advocacy; inquire about membership and publications relating to trails and environment.

Workshops, Seminars, and Courses on Ecology and Other Environmental Subjects--for Teachers and Others

Contact the college or university nearest you to see what they are presently offering, plan to offer, and could offer to your area. Write to Dr. M. Swan, LTFC, NIU, Box 299, Oregon, IL 61061 to be put on mailing list for *Update*.

Activities to Watch for

County Fairs
Local and County Garden Shows
Craft Demonstrations
Old Settlers Reunions! Ploughing, Threshing, and/or Tractor-Pulling Contests and Demonstrations

READER REACTION SHEET

Remembering that this is a SAMPLER, with no attempt to be comprehensive in looking at the environment around us, please give us your reaction.

1. How do you react to the general scope of this handbook?

2. If you are an urban resident of Illinois, is the material on non-urban areas of use to you?

3. If you live outside an urban area, is the material on urban areas of use to you?

4. What persons do you consider extraordinary as environmental resource people?

5. What environmental organizations do you belong to?

6. We are compiling a list of school sites especially useful for environmental study and would appreciate any suggestions you can give us. If possible, indicate the individual to contact in the school or district, the location of the site, and the phone number.

7. What kinds of environmental education materials and information would be of most help to you?

8. Would you like to receive environmental education information and information about what is happening in environmental education in Illinois on a regular basis. If so, give your name and address:

9. Please indicate whether you are a: teacher____, parent____, youth group leader____, other____(please indicate what other__________________).

Please mail this form to:

Environmental Curiosity Sampler 2

Illinois Institute for Environmental Quality
309 W. Washington Street
Chicago, Illinois 60606

Check here____if you wish to receive A Directory of Illinois Environmental Information. (Environmental groups, Recycling Centers, Markets for Recyclable Materials).

A PARTIAL DIRECTORY OF PUBLISHERS

Ace Books - Ace Publishing Co., 1120 Avenue of the Americas, New York, N.Y. 10036.

Appleton-Century-Crofts, 440 Park Ave., New York, N.Y. 10016.

Ballantine Books, 201 E. 50th St., New York, N.Y. 10022.

Bantam Books, Inc., 201 E. 50th St., New York, N.Y. 10022.

Benefic Press - Publishing Division of Beckley-Cardy, 10300 W. Roosevelt Rd., Westchester, Il. 60153.

Children's Press, 1224 W. Van Buren St., Chicago, Il. 60607.

Coward, McCann & Geoghegan, Inc., 200 Madison Ave., New York, N.Y. 10016.

Corwell - Thomas Y. Crowell Co., 666 Fifth Ave., New York, N.Y. 10019.

Day - John Day Co., Inc., 257 Park Ave. S., New York, N.Y. 10010.

Doubleday & Co., Inc. 501 Franklin Ave., Garden City, N.Y. 11530.

Dunes Enterprises, Beverly Shores, Ind. 46301.

Dutton - E.P. Dutton & Co., Inc., 201 Park Ave., New York, N.Y. 10003.

Elk Grove Books, Imprint of Children's Press.

J.G. Ferguson Publishing Co., 6 N. Michigan Ave., Chicago, Il. 60602.

Follett Publishing Co., P.O. Box 5705, Chicago, Il. 60680.

Golden Press, Imprint of Western Publishing, 850 Third Ave., New York, N.Y. 10022.

Grosset & Dunlap, 51 Madison Ave., New York, N.Y. 10010.

Harper & Row, Publishers, 16 E. 53rd St., New York, N.Y. 10003.

Hart Publishing Co., 719 Broadway, New York, N.Y. 10003.

Henry Regnery Co., 114 W. Illinois St., Chicago, Il. 60610.

Holt, Rinehart & Winston, Inc. 383 Madison Ave., New York, N.Y. 10017.

Houghton Mifflin Co., 2 Park St., Boston, Ma. 02107.

Interstate Printers & Publishers, Inc. 19-27 N. Jackson,
Danville, Il. 61832.

Knopf - Alfred Knopf, Inc. Subsidiary of Random House, order department, 457 Hahn Rd., Westminster, Md. 21157.

Lerner Publishing Co., 241 First Ave., N. Minneapolis, Mn.
55401.

Lippincott - J.B. Lippincott Co., E. Washington Square,
Philadelphia, Pa. 19105.

Little, Brown & Co., 34 Beacon St., Boston, Ma. 02106.

McGraw-Hill Book Co., 1221 Avenue of the Americas, New York,
N.Y. 10020.

Macmillan Co., 866 Third Ave., New York, N.Y. 10022.

Meredith Corp., 1716 Locust St., Des Moines, Ia. 50336.

Messner - Julian Messner, 1 W. 39th St., New York, N.Y.
10018.

M.I.T. Press, 28 Carlton St., Cambridge, Ma. 02142.

Morrow - William Morrow & Co., 105 Madison Ave., New York,
N.Y. 10016.

National Audubon Society, Educational Services, 1130 Fifth
Ave., New York, N.Y. 10028.

W.W. Norton, 500 Fifth Ave., New York, N.Y. 10036.

Northern Illinois University Press, De Kalb, Il. 60015.

Oxford University Press, 16-00 Pollitt Dr., Fair Lawn, N.J.
07410.

Parents' Magazine Press, 52 Vanderbilt Ave., New York, N.Y.
10017.

Pergamon Press, Maxwell House, Fairview Park, Elmsford, N.Y.
10523.

Popular Library - Subsidiary of Cadence Industries, Inc., 355
Lexington Ave., New York, N.Y. 10017.

Prentice-Hall, Englewood Cliffs, N.J. 07632.

Putnam - G.P. Putnam's Sons, 200 Madison Ave., New York, N.Y.
10016.

Rand McNally & Co., Box 7600, Chicago, Il. 60680.

Random House, 457 Hahn Rd., Westminster, Md. 21157.

Reilly & Lee Books, Henry Regnery Co., 114 W. Illinois St., Chicago, Il. 60610.

Rodale Press, Educational Services, Emmaus, Pa. 18049.

Scholastic Book Services, Inc. 904 Sylvan Ave., Englewood Cliffs, N.J. 07632.

Simon & Schuster, 630 Fifth Ave., New York, N.Y. 10020.

U.S. Government Printing Office, Superintendent of Documents, Washington, D.C. 20402.

University of Chicago Press, 11030 S. Langley, Chicago, Il. 60628.

University of Nebraska Press, 901 N. 17th St., Lincoln, Nb., 68508.

Viking Press, 625 Madison Ave., New York, N.Y. 10022.

H.Z. Walck, Inc., 750 Third Ave., New York, N.Y. 10017.

Warne - Frederick Warne & Co., 101 Fifth Ave., New York, N.Y. 10003.

Watts - Franklin Watts, Inc., 845 Third Ave., New York, N.Y. 10022.

Westminster Press, Witherspoon Bldg., Philadelphia, Pa. 19107.

Whitman Publishing Co., Western Publishing Co., 1220 Mound Ave., Racine Wis. 53404.

John Wiley, 605 Third Ave., New York, N.Y. 10016.

H.W. Wilson Co., 950 University Ave., Bronx, N.Y. 10022.

Workman Publishing Co., 231 E. 51st St., New York, N.Y. 10022.

World Publishing Co., 2080 W. 117th St., Cleveland, Oh. 44111.

BIBLIOGRAPHY

A general bibliography covering the many subjects in this Sampler.

Alexander, Taylor R. and George S. Fielder. Ecology: A Golden Guide, Golden Press, 1973. Small but excellent.

Benarde, Melvin A. Our Precarious Habitat: An Integrated Approach to Understanding Man's Effect on His Own Environment. W.W. Norton, 1970. $2.95.

Berry, James W., et al. Chemical Villains: A Biology of Pollution. Mosby, 1974. High school-adult.

Billington, Elizabeth. Understanding Ecology. Warne, 1971. Grade 6-up. $4.50.

Courtenay, Booth and James H. Zimmerman. Wildflowers and Weeds. Van Nostrand Reinhold Co., 1972. Excellent all-around guide, full-color for the region.

Cox, C. (ed.). Readings in Conservation Ecology. Appleton, Century, Crofts, 196[illegible].

Dasmann, Raymond F. Environmental Conservation. 2nd ed. John Wiley, 1963. $4.95.

Disch, Robert (ed.). The Ecological Conscience: Values for Survival. Prentice-Hall, 1970. $5.95.

Ellis, William Donahue. Land of Inland Seas. The Historic and Beautiful Great Lakes Country. American West. $20.

Falk, Richard A. This Endangered Planet. Random House, 1972. $2.95.

Hawkinson, John. Collect, Print, and Paint from Nature. Albert Whitman, 1963. Primary and intermediate grades. $3.00.

Hickey, Joseph J. A Guide to Bird Watching. Oxford University Press, 1943. Grade 6-up.

Hungerford, Harold R. Ecology, the Circle of Life. Children's Press, 1971. Jr. high-adult.

Jauss, Anne Marie. Discovering Nature the Year Round. Dutton, 1955. $7.00.

Kormondy, E. Concepts of Ecology. Prentice-Hall, 1969. $2.95.

Leopold, Aldo. Sand County Almanac. Oxford Press, 1949. A classic.

Linderman, Earl W. and D.W. Herberholz. Developing Artistic and Perceptual Awareness. W.C. Brown Co., 1964. For teachers.

Miles, Betty. Save the Earth: An Ecology Handbook for Kids. Knopf, 1974. $2.50.

Mormon, Jean Mary. Wonder under Your Feet: Making the World of Art Your Own. Harper & Row, 1973. $3.95.

National Association for Environmental Education, 5940 S.W. 73 Street, Miami, Florida 33143. Curriculum Materials: Man and Environment for the Intermediate Grades (Grades 4-8); Man and Environment for Secondary Schools.

Nickelsburg, Janet. Ecology: Habitats, Niches, and Food Chains. Lippincott, 1969. $4.50.

Pringle, Laurence. *Into the Woods. Exploring the Forest Ecosystem*. Macmillan, 1973. Grades 3-6. $5.00.

Pringle, Laurence. *This Is a River. Exploring an Ecosystem*. Macmillan, 1972. Grade 4-up. $5.00.

ReVelle, Charles and Penelope. *Sourcebook on the Environment. The Scientific Perspective*. Houghton Mifflin, 1974. High school-adult.

Saltonstall, Richard, Jr. *Your Environment and What YOU Can Do about It*. Ace Books, 1970. $1.25.

Sears, Paul B. *Lands Beyond the Forest*. Prentice-Hall, 1969. Grade 6-up.

Thoreau, Henry David. *Walden*. Houghton, 1893. *A classic*.

U.S. Department of Agriculture, Soil Conservation Service. *Outdoor Classrooms on School Sites: PA-975*. January, 1972. Order from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. Stock No. 0100-1458. 25¢.

U.S. Department of Interior, Bureau of Land Management. *All around You: An Environmental Study Guide*. For intermediate and jr. high but adaptable to other grade levels. Order from Supt. of Documents, U.S. Govt. Printing Office, Washington, D.C. 20402. $1.50. Stock No. 2411-0035.

ANNOTATED BIBLIOGRAPHY

(Also see lists of books at the end of the various chapters.)

Allen, Rodney F., et al. Deciding How to Live on Spaceship Earth: The Ethics of Environmental Concern. Winona, Minn. 55987: St. Mary's College Press, 1973. $3.60. A humanistic approach, focusing on the ethics of man-land, man-nature relations as vital in environmental education and leading to new life styles. Ethical reasoning skills, a knowledge of alternative commitments, the education of emotions and critical inquiry, based on sound data from both natural and social sciences, are considered essential in solving environmental problems.

Carson, Rachel. A Sense of Wonder. Harper & Row, 1965. Photos by Charles Pratt and others. $7.95 hard back; $3.95 paperback. Subjective, illustrated essay presenting methods of introducing a child to the world of nature, and all the beauty and enjoyment it can bring. Beautiful photography fitting in well with the excellent and minimal text. Written for adults.

Carson, Rachel. Silent Spring. Houghton-Mifflin, 1962 (rev. 1973). $6.95 hardback, $1.25 and $2.95 paperback editions. High school-up. An honest, compelling, and accurately researched book on the poisonous and biologically potent chemicals used by people largely ignorant of the potential for harm. A conscious attempt to present the interrelatedness of all of nature's components. Explains the ecological consequences of various insecticides and what must be done to halt their further disastrous effects, with an underlying fear that we may be too late in looking at and changing the situation.

Commoner, Barry. The Closing Circle: Nature, Man and Technology. Knopf, 1971. $6.95 hardback, $1.95 paperback. High school-up. Rather than bemoaning our past mistakes, Commoner attempts to understand them. "It is an effort to discover which human acts have broken the circle of life, and why." Presents actual situations which he examines from all sides: economic, social, scientific, political, and ecological. Also states how the problem could have been or could be solved. Commoner provides hope only if we alter the means by which we use the environment to produce wealth. An excellent all-around book which examines several environmental crises which occurred in and around Illinois, thus increasing the relevance to students, teachers and others in Illinois. Includes index and extensive notes.

Del Giorno, Bette J. and Millicent E. Tissair. Environmental Science Activities Handbook for Teachers. Parker & Sons, 1975. For teachers. This book contains many useful plans for conducting fascinating studies in environmental studies which lead to a better understanding of our natural surroundings. A complete sourcebook of ecological information which can make

the investigation of the environment easy and enjoyable for teachers and students alike.

Fritsch, Albert J. The Contrasumers: A Citizen's Guide to Resource Conservation. Praeger, 1974. $3.50. Fritsch identifies the crises into which the world is being led by its consumption habits, assesses energy and resource requirements, and offers specific suggestions for conserving energy and materials on four levels--individual, community, national, and international. Shows how changes in these habits of consuming may be brought about--from filing lawsuits through lying in front of a bulldozer. Book concludes with a Lifestyle Index, somewhat similar to a calorie counter, with which an individual can calculate his/her personal energy consumption and compare it with that of people in 90 other countries. The Index can help individuals develop a new awareness of their impact on the environment--the first step toward changing lifestyles in a meaningful manner.

Graham, Frank, Jr. Since Silent Spring. Fawcett World Library, 1970. High school-up. Graham describes the background of the remarkable Rachel Carson, whose Silent Spring changed the course of history, the genesis of her book, the furor it caused, and the campaign to malign her credibility. Examines the fact that Rachel Carson was proved right and compels us to recognize that the time has come to make crimes against the environment on a par with crimes against humanity. Compelling, engrossing, and disturbing, it urges the reader to press for the adoption of a sane, coordinated conservation and environmental policy.

Griffith, Charles J., Edward Landin, and Karen Jostad. EP - The New Conservation. Arlington Virginia: Izaak Walton League of America, 1971. High school-up. "EP", or Environmental Practice, is the Izaak Walton League's attempt to draw together concepts in conservation education and nature study and put them into a practical framework for individuals to use in their own community, school, or family. The book defines EP as a method of causing environmental education or action to occur by use of models or examples. Book reaches its stated goal of providing specific answers to how EP can be used with students, teachers, schools, communities, and governments. Easy to read. Appendices are valuable tools for those interested in environmental action: water body usage survey; runoff and effluents investigations; lake shore development attitude survey; land usage; curriculum materials list in Environmental/Conservation Education; a model ordinance to establish a municipal environment conservation commission; a citizen action checklist; and a community compatibility survey.

Pringle, Laurence. City and Suburb: Exploring an Ecosystem. Macmillan, 1975. $5.95. Grade 5-up. Shows the reader who is searching for ecosystems in a city, which seems totally man-made, where to look and what to look for. Locations of natural ecosystems, including sidewalk cracks, vacant lots, and parks are some of these places. Also shows how a city and its suburbs are truly an ecosystem, probably one of the most complex in the world, and how people, animals, and plants in these systems have developed ways in which they adapt to their rapidly-changing environment.

Pringle, Laurence. Ecology: Science of Survival. Macmillan, 1971. $4.95. Grade 5-up. Provides an accurate, clearly-presented, well-illustrated picture of all that ecology encompasses. Includes information on ecosystems and their non-living and living components, including producers, consumers, and decomposers; biomes of various types from desert to tundra; food chains, the flow of energy through an ecosystem, and the nitrogen, oxygen, and carbon cycles; and ecosystem's stability and how succession relates to it; human impacts on all elements of ecology, and why this must be understood to protect our environment. An excellent book with a complete index, for a library, student, teacher, or basic text for an ecology unit. For the teacher, it is broken into workable units that can be expanded to total lessons.

Pringle, Laurence. Recycling Resources. Macmillan, 1974. Grade 5-up. Shows how the necessity for recycling resources grew out of the problems created by a throwaway society. Cities, once with sufficient area for trash disposal, are running out of disposal space. Includes: information on conflicts between government, industry, and the consumer, modern methods of recycling, suggestions for individuals who want to help ease the crisis.

Pringle, Laurence. The Only Earth We Have. Macmillan, 1969. $4.95 hardback, $1.95 paperback. Grade 4-up. Introduces the spaceship earth concept and outlines why this concept has such significance in these times of rapidly increasing technology. Goes into detail on the topic of human impact on the earth and specifically on air pollution. Chapters on why we are a throwaway society, how this attitude can be counteracted and what can be done to offset the already apparent effects of these environmental attitudes; pesticides and their consequences; endangered species; and what can be done by the individual. This clearly-written book contains an index, glossary, list of conservation groups, and useful illustrations.

Sale, Larry L. and Ernest W. Lee. Environmental Education in the Elementary School. Holt, Rinehart, and Winston, 1972. Teachers and Administrators. Provides relevant, factual environmental education information for teachers. Also emphasizes that changes in education should begin when children are developing their environmental understandings and attitudes if the environment is to be protected.

Swatek, Paul. The User's Guide to the Protection of the Environment. Ballantine Books, 1970. $1.25. High school-up. Provides specific information on how to become users of the earth's resources rather than consumers and how to live in harmony with the land and its resources. Presents ways in which personal daily decisions affect the environment--for example, the impacts of cleaners, packaging, and other specific products. Useful for those who know that something must be done to help them live in harmony with natural resources, but are not sure of the facts.

Terry, Mark. Teaching for Survival. A Friends of the Earth/ Ballantine Book, 1971. $1.25. Teachers. Presents ways in which the schools themselves can become model environments, serving as central instruments for changing the society. Ethical and practical means for making fundamental changes in the educational system are presented--from the classroom, to the entire school, to the district. A single ecology class, divorced from the rest of life, is seen as inadequate for preparing people to participate in the natural world.

Tilden, Freeman. Interpreting Our Heritage. University of North Carolina Press, 1967 (rev. ed.). $1.95. For teachers and other adults. The one and only book available to educators on the topic of interpretation that is totally comprehensive and clear. Tilden outlines his principles of how, why and on what basis interpretation can and must exist to help convey to a group of people the leader will never see again an interest in and a love for nature. Basically a book on communication--how to realize the needs of an audience and to meet those needs.

Werling, Donn Paul. Environmental Education and Your School Site. Open Lands Project, 1973. (Copies available for $3.45 from Open Lands Project, 53 W. Jackson, Chicago, Illinois 60604). Presents documentation for school site development which can be presented to the school board and community at large. Defines a process approach to environmental education, i.e., an approach which involves the student body, school personnel, and community in planning, development, and use of the school site as a green island for school and community use. Three case studies are presented: an inner city school, a suburban school, and a school/ park complex on an urban fringe. Although not in detail, the problems, processes, and results involved with each situation are indicated. A chapter on how to use the developed school site includes how to involve and orient teachers, presenting strategies for teaching. Finally, deals with further developments that can occur as a result of school site development as presented, such as spin-offs from the school to the home and community. Appendices include tips on construction and use of teaching stations; an encounter format; guidelines for school site planning; school site analysis form sheets, and improvised play areas, an annotated reading list, and a bibliography.

NOTE: This annotated bibliography was written by Dr. Sonia Vogl, Oregon, IL.

INDEX

Acknowledgments 2
Activities to watch for 293
Agriculture 129-132
Air 83-89
Air pollution 83-89
Amtrak 102
Animal homes 53
Animals 52-54, 78-79
Animals in vacant lots 78-79
Animals of the city 54
Architecture (see Buildings) 29-34
Automobiles 84-86
Awareness 6-8. 23

Barge traffic 98
Beauty around you 73-75
Bibliography--also see end of most chapters-- 298-303
Birds 56-57
Bugs 54-55
Buildings 29-34

Cables, electric 81-82
Canals 149
Carlyle Lake 216-220
Cemeteries 234-235
Chicago Transit Authority (CTA) 102-103
Citizen Action 280-281
Cloud seeding 271
Cluster zoning 125
Coal-corn controversy 134-135
Cooling lakes 264
Compost pile 11, 254-255
Conservation Areas, State 187
Conservation districts 176
Container gardening 10
Corps of Engineers, U.S. Army 216-220
Council on Environmental Quality, Office of the President 283
Courses on Ecology and Other Environmental Subjects 293
Crab Orchard National Wildlife Refuge 227-228, 230

Dear Curious Individual letter 1
Decibels 68
Department of Conservation, Illinois, Lands under 183-188
Directory of Publishers 295-297
Drinking Water 14-16
Dunes 221-224

Ecology, beginning of 221
Ecosystems 46
Electric wires, underground 81-82
Energy, general 237-252
  agriculture 238-239
  conservation of energy 247
  conversion of energy 240-242
  early human uses of 238
  individual use 242-244
  present car use 244-245
  sources 246-249
Energy conservation for buildings 37-43
Environmental agencies 281
  state 281-282
  federal 282-283
Environmental decisions 274-285
Environmental history 160
Erie Canal 149

Farming (agriculture) 129-132
Feedlots 131
Fish hatcheries 188
Flooding 18-19, 127-129
Floodplains 19
Flower boxes 9
Food chains 57
Food pyramids 57
Food webs 57
Forest preserve districts 175-182
Fulton County Sludge Utilization Project 261-263

Garbage and trash 60-67, 255-256
Garden plots 9
Gardens 9-10
Gas lines, underground 81-82
Great Lakes Tomorrow program 168
Green Areas--see Open Spaces, Green Areas
Glossary 291

Hearing (Senses) 69
Heat island effect (weather) 269

Highrise buildings 32-33
Historical memorials 186
History of Illinois 143-162
History, environmental 160
History, living 157-158, 163-164
History, oral 158-159
House plants 9-10
Human scale 33

Illinois 111-121
  general description 111-112
  geology and soils 112-113
  history 143-164
  chronological list 150-155
  people and the land 114-116
  population by counties 120-121
  urban environment 116-118
Illinois waterway 97-98
Illinois-Michigan Canal
Incinerator 61
Indiana Dunes National Lakeshore 221-224
Indians 143-146
Influences on weather 267-268
Insects and bugs 54-44
Interdependence 46 and throughout Sampler

Jolliet and Marquette 144
John Hancock Center 32-33

Lake Michigan 165-170
Lake Michigan Federation 168
Lake Shelbyville 216-220
Landfills--see sanitary landfill
Land use, importance of 111-126
Litter 64
Living history 157-158, 163-164
Living things 46-59

Mammals (in city) 54
Mark Twain National Wildlife Refuge 227-228, 230
Marquette and Jolliet 144
Mass transportation 101-109
Metropolitan Sanitary District 17, 260-261
Mining 133-135
Mt. Trashmore Concept 255-256

National Forest (Shawnee) 231-232
National park (Indiana Dunes National Lakeshore) 221-224
National wildlife refuges 226-230
  Crab Orchard 227
  Mark Twain 227-228, 230
  Upper Mississippi 228-229
Nature preserves 189-204
Neighborhood 23-28
New towns 118
Noise 68-72

Open Spaces/Green Areas, need for 173-174
Oral History 158-159
Ozone 269-270

Palzo Restoration Project 260-261
Parks, local 183
Parks, state 184-185
Paved land
Photosynthesis 47-49
Pioneer Life in Illinois 147-149
Pipes 81-82
Planned unit development 126
Planning 122-125
Plants 9-11
  in vacant lots 77-78
  in prairies
Plazas 34-36
Population of Illinois by counties 120-121
Potted plants 9
Prairie animals 207
Prairie plants 205-207
  in cemeteries 235
Prairies 205-215
  animals of 207
  birds of 207-208
  insects of 207
  kinds of 206-207
  plants of 205-207
Publishers, Directory of 295

Rail center 96

Reader's Reaction Sheet 294
Recycling 65, 257-259
Regional Transportation System (RTA) 103-104
Rend Lake 217-220
Resources 292-293
Restorations 34
Rural environment 119

Salt Creek Plan of Forest Preserve District of DuPage County 263-264
Sanitary landfills 62-64
Save the Dunes Council 223
Schoolgrounds--see School Sites
School Sites--Use and Development 90-94
Seaport of Chicago
Sears Tower 33
Seasons 268
Seminars on the Environment 293
Senses 6-8
Sewer pipes 81-82
Shawnee National Forest 231-233
Shuttle busses 103-104
Sight (senses) 6
Sludge 10-11
Smelling (senses) 7
Soil 50-52, 76-77
  in vacant lots 76-77
Soil Conservation Service, U.S. Dept. of Agriculture 19, 161
Solar heating and cooling 42-43
Solid wastes 60-67
Sound 68
Space 171-172
Space around buildings 34-35
State Parks 184-185
Stripmining 134-135
Suburban environment 118-119

Tasting (senses) 7
Telephone lines, underground 81-82
Tires 264-265
Touching (senses) 7

Transportation 96-110
  Air 100-101
  History 96
  Mass 101-106
  Pipeline 100
  Rail 98-100
  Road 97
  Truck 97
  Waterways 97-98
Trash 66-67
Tree farms 188
Trees 45-50

United States Army Corps of Engineers 216-220
United States Fish and Wildlife Service 226
Upper Mississippi River Wildlife and Fish Refuge 228-229, 230
Utilities, underground 81-82

Vacant lots 76-80
Values Clarification 24

Waste, solid 60-67
Wastes as resources 253-266
  Cooling lakes 264
  creative garbage piles 255-256
  Fulton County Sludge Utilization Project 261-263
  Garbage to electricity 256-257
  Palzo Restoration Project 260-261
  Recycling Glass, etc. 257-259
  Salt Creek Plan of Forest Preserve District of DuPage County 263-264
  Sludge 259-260

  Tires 264-265
  Wastes from water treatment plants 259
  Wastes from yards 254-255
Water
  cycle 13-14
  drinking 14-16
  waste water 16-17
Watersheds 18-19

Weather 267-273
  Cloud seeding 271
  Heat island effect 269
  Influences on 267-268
  Ozone 269-270
  Seasons 268
  Weather modification 269-271
Web of life 57-58
Wetlands 129
Workshops on ecology and the environment 293

Zoning 125-126